Frontier Hard Chrome
Event 7 Long-Term Monitoring Report
(June 2006 Results)

Department of Ecology Contract: C0500198

July 2006

Weston Solutions, Inc. · 190 Queen Anne Avenue North · Seattle, WA 98109-4926

06-0082 Cover.ai

FRONTIER HARD CHROME
LONG-TERM MONTORING REPORT
EVENT 7—JUNE 2006
VANCOUVER, WASHINGTON

Prepared for

Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504

Contract No. C0500198

Weston Work Order No. 10799.004.001.0020

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06-0082

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SECTION 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Long Term Monitoring Report has been prepared under Contract C0500198 to the State of Washington Department of Ecology (Ecology) for Long Term Monitoring of the Frontier Hard Chrome (FHC) site located in Vancouver Washington.

This report describes the sampling activities performed and analytical results obtained during "Event 7" of the long-term groundwater monitoring program at FHC. Sampling activities for Event 7 were conducted during June 2006.

The FHC site was the subject of a remedial action conducted during the summer of 2003. The purpose of the remedial action (RA) was to treat the site's chromium-contaminated soil and groundwater to cleanup levels specified in the Record of Decision. Long term monitoring is required to track offsite plume concentrations as well as show that the remedy is maintaining its operational functionality.

The first 3 groundwater monitoring events (Events 1 through 3) were conducted for the United States Environmental Protection Agency (EPA). In October 2004, responsibility for this site was turned over to Ecology. Ecology contracted Weston Solutions, Inc. (Weston) to perform the next 2 rounds of monitoring (Events 4 and 5) as a result of Weston's familiarity with this site and the associated property owners. Ecology amended Weston's contract in February 2006 to perform 6 additional rounds of quarterly monitoring with the last to be completed in June 2007.

All Event 7 work was performed in accordance with project work plan titled *Frontier Hard Chrome, Long Term Monitoring Plan* (Weston 2004). No significant deviations from the work plan occurred. Wells W85-6A and W85-6B, which were previously damaged and lost during construction of a shopping mall, were found, recovered, and sampled.

1.2 BACKGROUND AND PROBLEM DEFINITION

1.2.1 Site Background

The FHC site is located in southeastern Vancouver, Washington (Figure 1). The facility address is 113 "Y" Street, Vancouver, Washington. The site is located in the Section 25, Township 2 north, Range 1 east, Willamette Meridian in Clark County, Washington. The location in latitude and longitude coordinates is 45 degrees, 37 minutes, 19 seconds north by 122 degrees, 38 minutes 45 seconds east (Degrees, Minutes, Seconds [DMS]). The site was previously occupied by several metals fabricating businesses and was used for storage and as a staging area for a neighboring business. Currently, no buildings exist on the site and the site is vacant. A truck driving school is operating on the parcel south of the site.

The FHC site proper covers approximately 0.5 acre and is bordered to the east by Grand Avenue, to the south by Test-U, and to the west by "Y" Street.

Work began on the remedial design in October 2001. The remedial design was completed in February 2003. The remedial action, consisting of building demolition, treatment of source area soil and groundwater, and installation of an in-situ redox manipulation (ISRM) treatment wall (to treat hexavalent chromium), was completed in September 2003.

1.2.2 Problem Definition

The goal of the remedial action was to treat source area soil and groundwater to reduce hexavalent chromium concentrations such that groundwater downgradient of the site would attenuate to chromium concentrations less than 50 micrograms per liter (ug/L). To demonstrate this, groundwater quality was monitored in two areas. The first area consisted of locations immediately within and down gradient of the ISRM wall. Wells located within and just down gradient of the wall were monitored to ensure the continued operational functionality of the ISRM Treatment Wall. The second area monitored consisted of the historical chromium contaminated groundwater plume located down gradient of the ISRM wall. This down gradient plume did not receive treatment during the remedial action and was monitored to track the long-term expected reduction in chromium concentration as a result of completing the remedial action and elimination of the source of hexavalent chromium.

Long-term groundwater monitoring is required by the site's Record of Decision.

1.3 MONITORING SCHEDULE

Sampling events performed for EPA were conducted approximately quarterly for the first year after completion of the remedial action. Planned sampling events were completed in February, April, and August 2004. The sampling event performed the week of 16 August 2004 concluded monitoring for approximately one year after the remedial action was completed.

In September/October 2004, monitoring of the FHC site was turned over to the Washington State Department of Ecology. Sampling of the site groundwater for Ecology occurred in May 2005 and again in December 2005. In February 2006, Ecology amended Weston's contract to perform 6 additional rounds of monitoring to be done quarterly: March 2006, June 2006, September 2006, December 2006, March 2007 and June 2007.

SECTION 2

SAMPLING ACTIVITIES AND RESULTS

2.1 MONITORING WELL SAMPLING PROCEDURES

Sampling activities for Event 7 were conducted on June 12th through June 15th, 2006 by Weston Solutions, Inc, (Weston).

The monitoring wells in the vicinity of the FHC site are shown on Figure 2. A total of 33 wells in the vicinity of the site were sampled for metals in accordance with the *Long Term Monitoring Plan* (Weston 2004). Wells W85-6A and W85-6B which had previously been damaged and lost during site demolition for construction of a shopping mall were found and uncovered. New monuments were constructed and casing extensions were added to bring the wells to the top of the fill added to the site.

Well purging and sampling were performed according to sampling guidelines and Weston standard operating procedures. The wells were sampled with a peristaltic pump equipped with new polyethylene tubing deployed to mid-screen depth at each well. The wells were purged prior to sampling until monitored field parameters (turbidity, conductivity, pH, dissolved oxygen, ORP, and temperature) stabilized. The field parameter readings were recorded on field sampling forms.

During Event 7, the water quality meter failed during the second day of sampling. The planned sampling schedule was revised such that "well-behaved" wells that stabilized quickly in previous rounds were sampled during the second day. These wells were purged for a period of time equal to or longer than that required by previous rounds of sampling. Turbidity was also monitored. Eight wells were effected, i.e., they were purged and sampled without definitive information on temperature, dissolved oxygen, conductivity, pH, or ORP. The 8 wells effected were: RA-MW-17A, RA-MW-14A, RA-MW-14B, W97-19A, W97-19B, W97-18A, W97-18B, and W98-20A. Another water quality meter was obtained to replace the failed unit for the next days sampling.

Groundwater samples were analyzed for total analytes list (TAL) metals. In cases where groundwater turbidity was greater than 10 nephalometric turbidity units, samples were passed through a 0.45-micron filter in the field and submitted for dissolved TAL metals. Three wells (RA-MW-12A, RA-MW-12B, W85-6B) had turbidity in excess of 10 NTU. During Event 7, both total and dissolved metals analyses were performed on samples collected from RA-MW-15B and RA-MW-16B at Ecology's request.

Selected samples were analyzed for total sulfur and sulfate to provide an assessment of the distribution of byproducts from the reducing agent used during ISRM wall installation.

Groundwater chromium concentrations are provided in Table 1. Measured field parameters are provided in Table 2.

2.2 ANALYTICAL RESULTS

2.2.1 Chromium

Chromium was detected in 30 of the 33 wells sampled. Total chromium concentrations in the "A" zone ranged from a maximum concentration of 125 ug/L in well RA-MW-12A to non-detectable concentrations in 2 other wells. All wells except RA-MW-12A and B87-8 had total chromium concentrations less than 10 ug/L. Monitoring well RA-MW-12A (which has generally had the highest concentration of chromium) had non-detectable levels of dissolved chromium (50U ug/L). Filtered samples (in addition to unfiltered samples) have been routinely collected from well RA-MW-12A due to its high turbidity. Overall, chromium in filtered samples from well RA-MW-12A have decreased from 192 ug/L (October 2003) to the current concentration of 50U ug/L. "A" zone chromium concentrations and plume contours are shown in Figure 3. Filtered sample data was used in preparing Figure 3 where available.

Chromium concentrations in "B" zone groundwater were similar to those in "A" zone groundwater. Total chromium concentrations in "B" zone groundwater ranged from a maximum of 152 ug/L downgradient of the site (well RA-MW-15B) to non-detectable concentrations in 1 other location. The filtered sample from well RA-MW-15B had non detectable chromium concentrations (5U ug/L). "B" zone chromium concentrations and plume contours are shown in Figure 4. Filtered sample data was used in preparing Figure 4 where available.

Figures showing the chromium concentration trends in groundwater over time are included in Appendix A. Data from wells sampled during Operational and Functional monitoring in November and December 2003 are included in these figures where available to assist in determining trends. Laboratory chromium data sheets for the June 2006 sampling event are provided in Appendix B.

Figures 3, 4, and those in Appendix A used filtered chromium values where available. In this latest June 2006 round of sampling, turbidity exceeded 10 NTU in three wells; RA-MW-12A, RA-MW-12B and W85-6B. However, filtered samples were also collected from well RA-MW-15B, and RA-MW-16B. Filtered samples were collected from wells RA-MW-15B and RA-MW-16B at the request of Ecology to assist in determining the cause of the elevated total chromium concentrations in previous sampling events.

2.2.2 Water Quality

Dissolved oxygen (DO) concentrations ranged from a low of 0.22 mg/L to a high of 10.9 mg/L. DO averaged 1.54 mg/L in samples collected within the ISRM Treatment Wall. The concentrations of DO in this latest round of sampling are similar to the previous round of sampling. This most recent calculation of average DO concentration was limited to only 4 wells due to issues with measuring accurate DO levels in wells containing treatment reagents. The measured low DO concentrations indicate the wall is still reductive which is necessary for treatment of hexavalent chromium. Samples of groundwater collected downgradient of the ISRM Treatment Wall had higher concentrations of DO which tended to increase with distance from the wall.

pH ranged from 6.1 to 8.9. The highest pH during this round was located in well W86-6B which is one of the two downgradient wells recovered from the construction site. This is an unusually high pH for this well. This well also had high turbidity which would not clear itself with purging. The cause of the high pH is unknown. The high pH may be due to concrete that inadvertantly fell into the well during demolition of the parking lot, or possibly even during construction of the new well monument.

The highest sulfur and sulfate concentrations were located within the treatment wall. Maximum sulfur and sulfate concentrations in groundwater were 322 mg/L and 993 mg/L, respectively. Concentrations of sulfur and sulfate were significantly lower immediately downgradient of the wall.

2.3 GROUNDWATER FLOW DIRECTION AND ELEVATION

Groundwater surface elevations were determined using the known elevation of the top of each well casing and the depth to groundwater measured in each long term monitoring well. The depth to groundwater measurements were collected during the evening of 13 June 2006. The Columbia River elevation at the United State Geological Survey (USGS) gauging station 14144700 located at the nearby I-5 bridge was obtained for use in determining flow direction. The elevation of the river at 1800 hours on 13 June 2006 was 12.34 feet (corrected to NGVD 1929 by adding 1.82 feet to the measured river elevation). The river elevation information can be obtained from http://waterdata.usgs.gov/wa/nwis/.

Groundwater surface elevations for each well measured are shown in Table 4. Groundwater levels in wells W85-6A and W85-6B could not be measured since the new casing risers on these wells had not been surveyed.

The groundwater flow direction (as determined using groundwater surface elevations measured in each well within a period of 2.0 hours) is heading towards the FHC site. A horizontal gradient was calculated for 13 June 2006 with a result of 0.00005 ft/ft with a flow direction from the Columbia River towards FHC. The groundwater table during this period had a drop in elevation of 0.12 feet over a distance of 2,400 feet.

Groundwater elevation and gradient information is graphically shown in Figure 5.

2.4 QUALITY ASSURANCE

Data quality was checked by running field duplicates. Laboratory duplicates and matrix spike analyses were performed by the lab. Table 5 shows the quality control results.

Field duplicates were run on both filtered and unfiltered samples during this sampling event. Filtered duplicate results were consistent with original sample results. The duplicate run on the unfiltered sample had good correlation to the original sample with a relative percent difference of 3.7%.

2.5 INVESTIGATION-DERIVED WASTES

Investigation-derived waste (IDW) generated during the sampling event consisted of well purge water, used PPE, and disposable sampling supplies. During sampling, purge water was stored on site in 5-gallon buckets. At the completion of sampling, the water was transported to the City of Vancouver's operations center and disposed of in accordance with the disposal permit issued to Weston by the city. Approximately 79 gallons of water was disposed. Personnel protective equipment and other solid wastes were disposed of in a dumpster.

2.6 DISCUSSION AND CONCLUSIONS

Chromium concentrations in onsite "A" zone groundwater in and around the ISRM Treatment Wall were generally less than 10 ug/L. Chromium concentrations in groundwater between the ISRM Treatment Wall and East 1st Street were also less than 10 ug/L. Chromium concentrations in well B87-8, located south of East 1st Street, were 22 ug/L. In general, the chromium concentrations in groundwater on and downgradient of the site were relatively uniform during the June 2006 sampling event with almost all chromium concentration less than 10 ug/L.

The deeper "B" zone groundwater downgradient of the site contained chromium in concentrations similar to that in the "A" zone. Chromium concentrations in "B" zone groundwater on and downgradient of the site were also less than 10 ug/L (with the exception of well RA-MW-15B which had a total chromium concentration of 152 ug/L).

Wells RA-MW-15B and RA-MW-16B have had anomalously elevated chromium concentrations in unfiltered samples in the last few rounds of sampling beginning in May 2005. Small black particulate was also observed in samples collected from these wells in December 2005. Therefore, both unfiltered and filtered samples were collected from these wells during this sampling event regardless of turbidity. The unfiltered sample from well RA-MW-15B had a chromium concentration of 152 ug/L whereas the filtered sample had a chromium concentration of 5U ug/L. The unfiltered and filtered sample from well RA-MW-16B had minimal differences in chromium concentrations (unfiltered – 3.2 ug/L; filtered – 5U ug/L).

Similar to the March 2006 groundwater sampling event, turbidity in several of the samples was difficult to control. Any slight movement of the tubing inside the well casing caused the turbidity to spike and release black particulate into the water. Care was taken to let the turbidity subside before samples were collected.

Well RA-MW-16A located downgradient of the treatment wall had evidence that reagents had reached this well. Well RA-MW-16A generated purge water that had a mild sulfur smell when purged. No other signs of reagent were seen in the downgradient wells.

Dissolved oxygen data collected from within the ISRM Treatment Wall indicates that an area of reducing conditions still exists implying the hexavalent chromium treatment zone is still active. Most locations within the treatment wall contain dissolved oxygen at concentrations less than 2.0 mg/L and negative oxygen reduction potential (ORP) implying reducing conditions are present.

Sulfur/sulfate concentrations within the ISRM Treatment Wall have fluctuated while sulfur/sulfate concentrations downgradient of the ISRM Treatment Wall have generally increased since February 2004. Sulfur/sulfate concentrations in well B87-8 and B85-4 located across East 1st Street (downgradient of the site) have increased by a factor of approximately 2 to 3 since February 2004. Sulfur and sulfate concentrations were less than 125 mg/L and 400 mg/L in most locations sampled during June.

Overall, the chromium concentrations during this round of sampling are similar to previous rounds. Dissolved oxygen readings in wells RA-MW-12A, -12B, -11A, -11B were unrealistically high likely due to interference from reagents in these wells. These reagents also are the likely cause of higher than usual detection limits for chromium. There was evidence that the sulfur bearing reagents were still present downgradient well RA-MW-16A. Downgradient well RA-MW-15A had no odor or unusual color.

SECTION 3

ANALYTICAL METHODS AND DATA VALIDATION

3.1 ANALYTICAL METHODS REQUIREMENTS AND DATA VALIDATION

The laboratory data quality assurance review and validation of analytical results for 40 water samples has been completed. Samples were collected between 12 June 2006 and 15 June 2006 from the Frontier Hard Chrome site and were analyzed for dissolved and total recoverable chromium.

The quality assurance review was performed on the laboratory data sheets and the WDOE memorandum to ensure that the analytical results met data quality objectives for the project. All laboratory quality assurance results as applicable (e.g., holding times, blank sample analysis, matrix spike/duplicate analysis, laboratory control sample analysis) supplied to Weston for the analyses met acceptance criteria specified in the work plan (Weston 2004), with the following exception.

> The laboratory indicated that chromium recovery from calibration check sample analyses were less than the lower control limit; but did not provide the recoveries. If any recovery is less than 75 percent, non-detected chromium results would be rejected for use. For the present event, this would affect sample **RA-MW-11A**. Due to the lack of additional information, no data were qualified for this event.

Samples from wells **RA-MW-12A, RA-MW-12B, RA-MW-16, W85-6B** and **RA-MW-15B** were collected both as total (unfiltered) and dissolved (field-filtered) fractions – with one fraction submitted for total recoverable chromium analysis and the other filtered at the time of collection and submitted for dissolved chromium analysis.

Data validation documentation is provided in Appendix C.

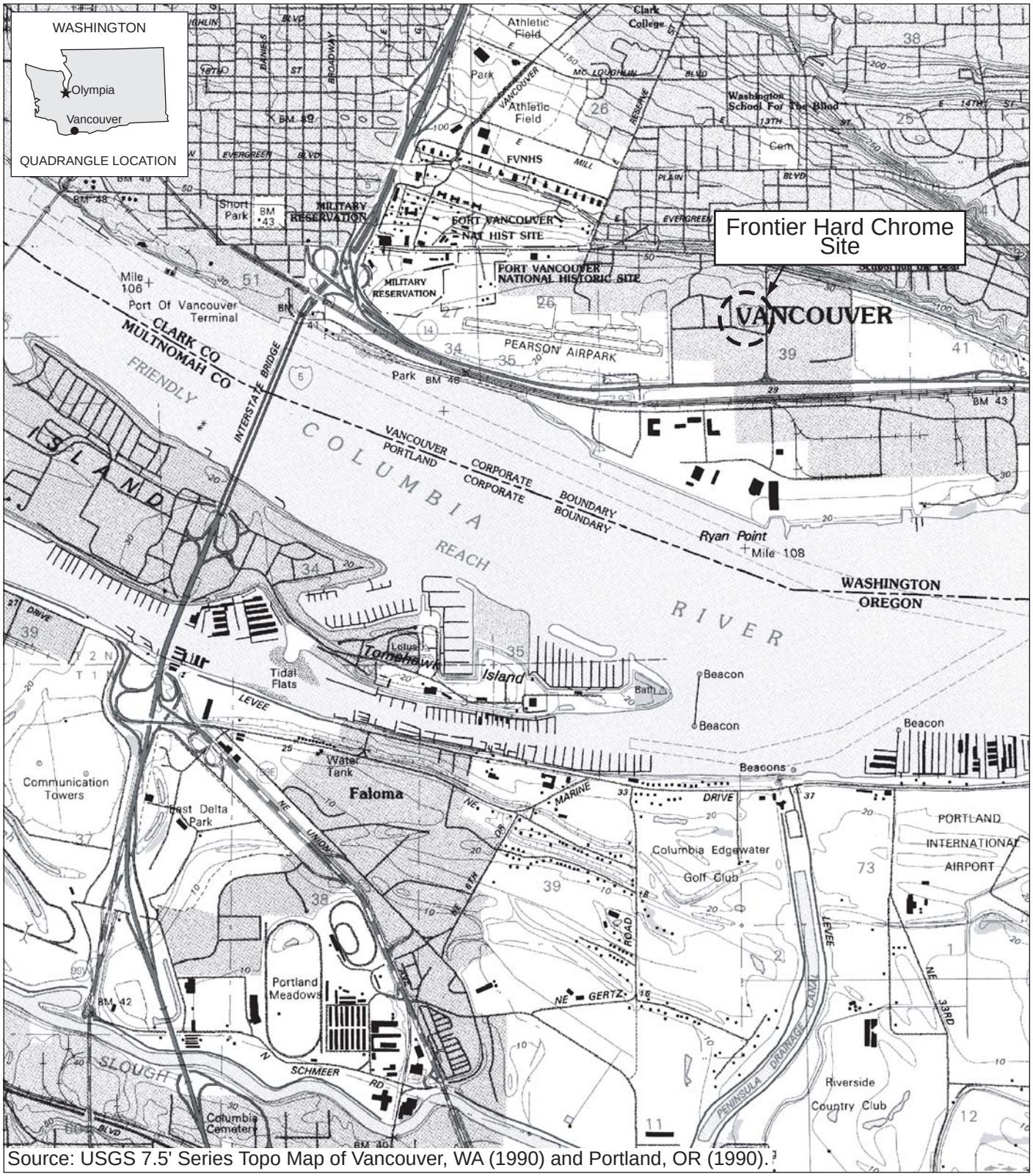
SECTION 4

REFERENCES

EPA (United States Environmental Protection Agency), 2003. Statement of Work for Long Term Response Action. Frontier Hard Chrome, Vancouver, WA. December 30th, 2003.

Weston (Weston Solutions, Inc.), 2004. Frontier Hard Chrome Long Term Monitoring Plan. Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington. February.

FIGURES



Source: USGS 7.5' Series Topo Map of Vancouver, WA (1990) and Portland, OR (1990).

0 1000 2000

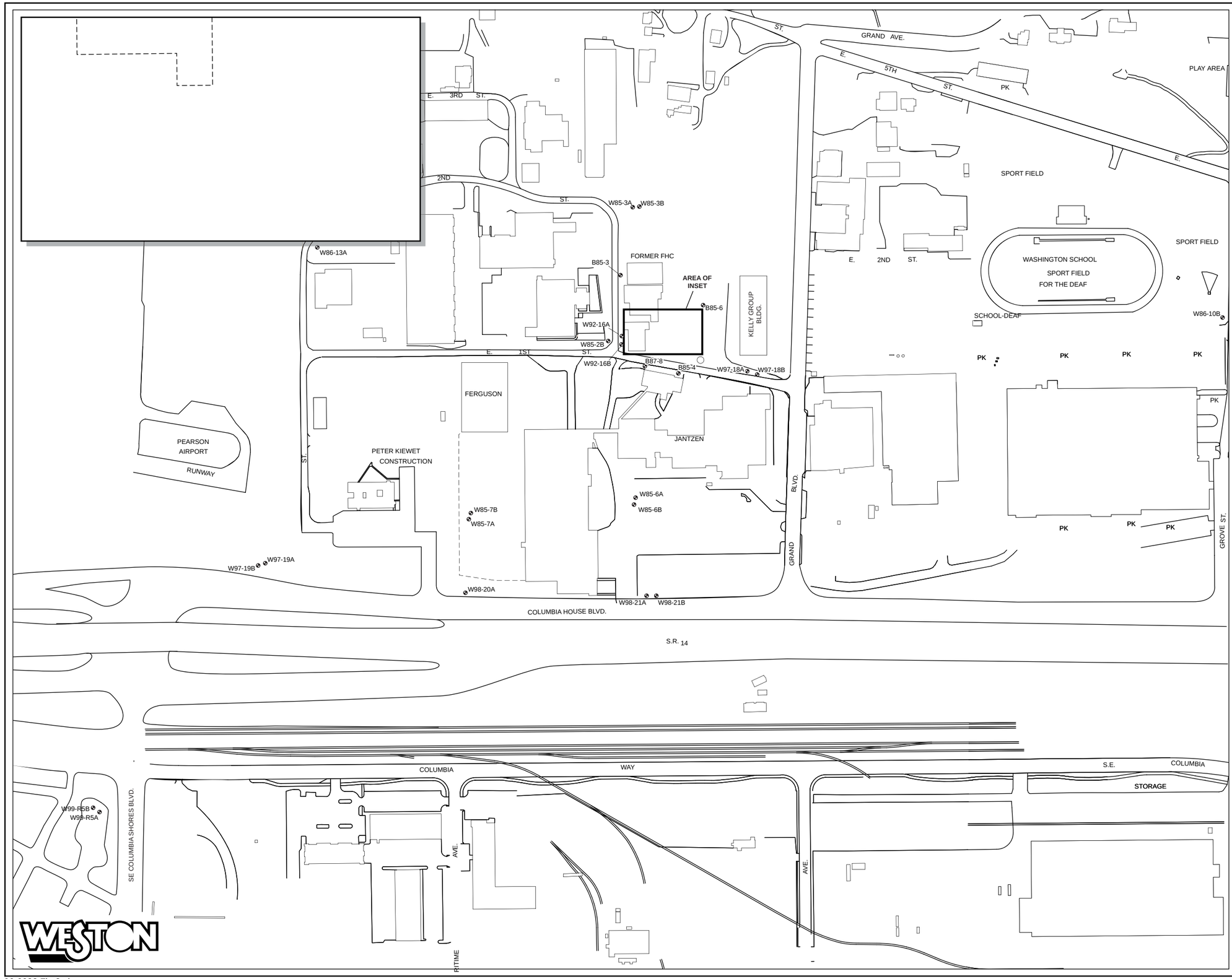
Scale in Feet

Frontier Hard Chrome
Vancouver, Washington
Vicinity Map

Figure

1

06-0082 Fig1.ai



LEGEND

W85-5B Monitoring Well Location and ID

Fence

0 150 300

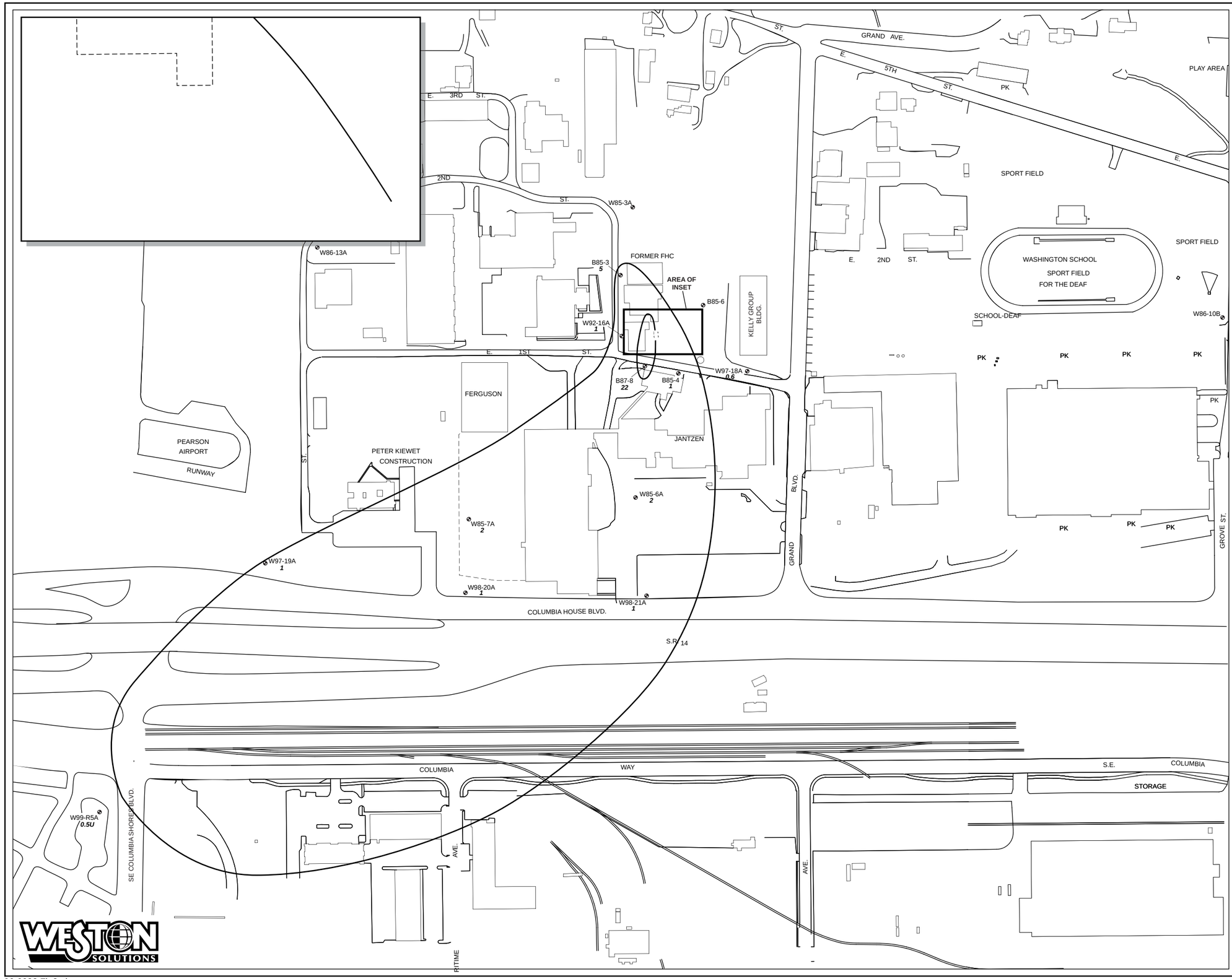
Scale in Feet

Frontier Hard Chrome
Vancouver, Washingto
Monitoring Well Locations

Figure
2

WESTON

06-0082 Fig 2.ai



LEGEND

- W85-7A — Monitoring Well Location and ID
- 1.7 — Chromium Concentration (µg/L)
- —10— Concentration Contour (µg/L)

N

0 150 300

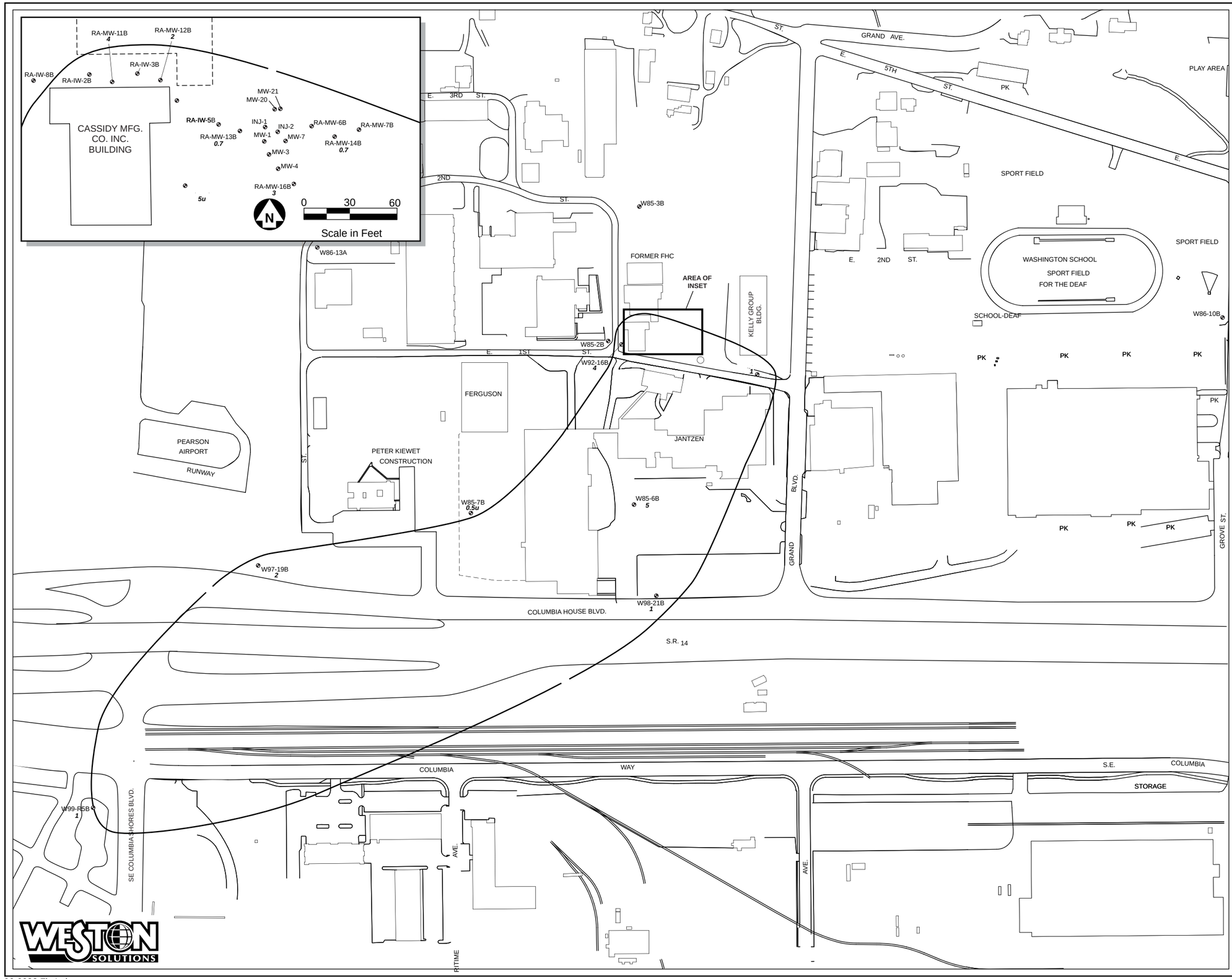
Scale in Feet

Frontier Hard Chrome Vancouver, Washington Chromium Concentrations in Zone A Groundwater June 2006

Figure **3**

WESTON SOLUTIONS

06-0082 Fig3.ai



LEGEND

- W85-7A — Monitoring Well Location and ID
- 18 — Chromium Concentration (µg/L)
- 10 — Concentration Contour (µg/L)

N

0 150 300

Scale in Feet

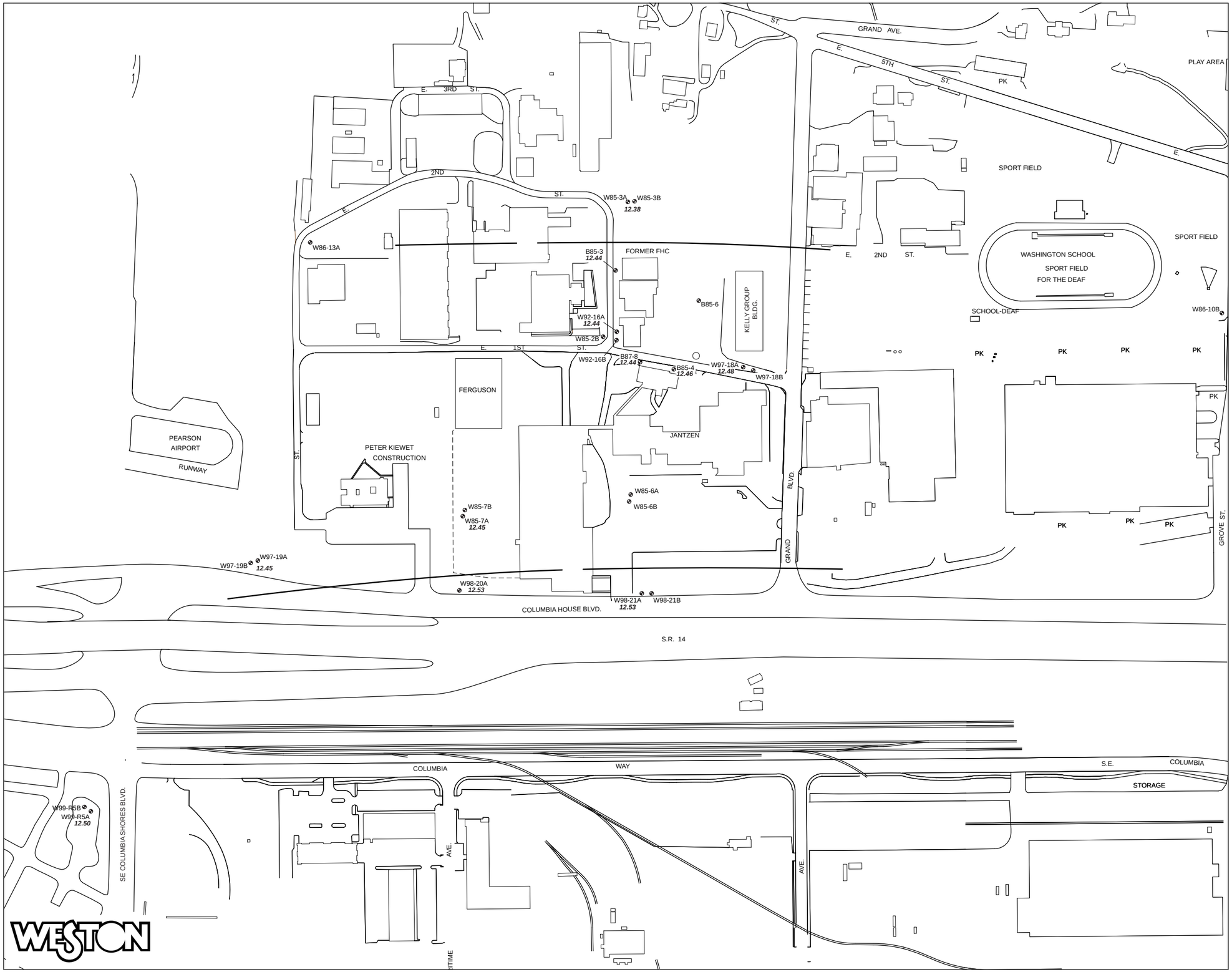
Frontier Hard Chrome Vancouver, Washington Chromium Concentrations in Zone B Groundwater June 2006

Figure

4

WESTON SOLUTIONS

06-0082 Fig4.ai



LEGEND

- W85-7A — Monitoring Well Location and ID
- 6.32 — Groundwater Elevation (ft. AMSL)
- Groundwater Elevation Contour
- Fence

0 150 300

Scale in Feet

Frontier Hard Chrome
Vancouver, Washington
A Zone
Groundwater Elevations
June 13, 2006

Figure **5**

WESTON

06-0040 Fig5_613.ai

TABLES

Table 1—Frontier Hard Chrome—Event 7 Chromium Results

Well Number	Concentration (ug/L)		Sample Observations
	Total	Dissolved	
RA-MW-12A	125J	50U	Purge water initially black, then turned yellow-green as more water purged. Strong sulfur smell.
RA-MW-12B	2.4J	5U	Transparent yellow-green color, sulfur smell. As sample sits, it turns cloudy, NTU increases.
RA-MW-12C	0.6J	--	
RA-MW-11A	5UJ	--	Initial purge water was clear with black particles, strong sulfur smell.
RA-MW-11B	3.7	--	Initial purge water dark gray due to black particles, strong sulfur smell.
RA-MW-13A	1.5	--	Yellow-green color, sulfur odor.
RA-MW-13B	0.7	--	
RA-MW-13C	4.1	--	
RA-MW-17A	5.7	--	
RA-MW-14A	1.8	--	Faint yellow green color, slight sulfur smell.
RA-MW-14B	0.7	--	Light yellow-green. No odor.
RA-MW-16A	2.8	--	Clear, slight sulfur smell.
RA-MW-16B	3.2	5U	
RA-MW-15A	4.6	--	
RA-MW-15B	152	5U	
B87-8	21.8	--	
B85-3	5.4	--	
W92-16A	1.1	--	
W92-16B	3.7	--	
B85-4	0.9	--	
W97-18A	0.6	--	
W97-18B	1	--	
W85-7A	1.5	--	
W85-7B	0.5U	--	
W97-19A	1.2	--	
W97-19B	2.1	--	
W98-20A	1	--	
W99-R5A	0.5U	--	
W99-R5B	1.4	--	
W98-21A	1.2	--	
W98-21B	1.2	--	
W85-6A	2.2	--	
W85-6B	4.8	5U	

-- denotes no sample collected

U: denotes analyte was not detected

J: denotes estimate.

Table 2—Frontier Hard Chrome—Event 7 Monitoring Field Parameters[1]

Well Number	Temp C	Spec. Cond. (mS/cm)	DO (mg/L)	pH	ORP (mV)	Sulfur[2] (mg/L)	Sulfate[2] (mg/L)	Turbidity (NTU)
RA-MW-12A	14.3	2.37	52.7*	8.46	-363			47
RA-MW-12B	14.4	1.39	45.1*	7.76	-327			14
RA-MW-12C	14.2	0.88	5.16	7.92	-191			0
RA-MW-11A	15.1	1.46	24.2*	6.46	-216	322	993	2
RA-MW-11B	14.7	0.94	26.6*	6.69	-278			3
RA-MW-13A	13.7	1.66	0.27	6.82	-93	213	682	1
RA-MW-13B	14.1	0.82	0.35	6.95	-85			1
RA-MW-13C	13.8	0.82	0.41	7.25	-112			5
RA-MW-17A	--	--	--	--	--			1
RA-MW-14A	--	--	--	--	--	124	396	1
RA-MW-14B	--	--	--	--	--			9
RA-MW-16A	13.4	1.01	0.54	6.44	-93			1
RA-MW-16B	13.8	0.51	0.27	6.85	-66			0
RA-MW-15A	14.7	1.44	0.47	6.28	-28			1
RA-MW-15B	14.5	0.8	0.3	6.26	34			4
B87-8	14.5	0.27	0.37	6.35	86	21	74	3
B85-3	13.6	0.64	0.22	6.42	-43			6
W92-16A	14.1	0.28	0.45	6.67	61			2
W92-16B	13.8	0.42	0.54	7.38	30			7
B85-4	14.3	0.33	0.52	6.21	86	21	75	0
W97-18A	--	--	--	--	--			9
W97-18B	--	--	--	--	--			6
W85-7A	13.7	0.16	5.89	6.24	127	5	18	0
W85-7B	13.4	0.02	10.96	6.37	167			1
W97-19A	--	--	--	--	--			1
W97-19B	--	--	--	--	--			1
W98-20A	--	--	--	--	--			0
W99-R5A	15.1	0.2	5.1	6.23	116	6	18	1
W99-R5B	14.7	0.22	4.2	6.26	111			3
W98-21A	13.7	0.22	3.26	6.11	114			0
W98-21B	13.7	0.21	3.37	6.07	117			0
W85-6A	13.7	0.23	1.86	6.25	107	12	35	1
W85-6B	13.8	0.1	7.87	8.93	79			51

[1]Parameters measured after readings stabilized.

[2]Sulfur and sulfate data obtained from laboratory analyses.

*: Denotes sulfur interference with dissolved oxygen readings.

Table 3—Comparison of Conventional Parameters

Well #	Temp (C)							Conductivity (mS/cm)						
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06
RA-MW-12A	14.9	15.9	17.9	15.2	14.9	14.6	14.3	6.01	5.4	4	3.32	2.52	2.47	2.37
RA-MW-12B	14.4	16.6	16.7	15.6	14.3	14.9	14.4	2.25	1.19	1.52	2.56	2.47	1.34	1.39
RA-MW-12C	14.4	16.5	16.6	15.1	14.2	14.3	14.2	2.18	1.34	1.13	0.68	1.09	0.69	0.88
RA-MW-11A	15.7	16.5	17.4	15.7	15.0	15.1	15.1	1.67	1.89	2.02	1.48	1.82	2.01	1.46
RA-MW-11B	14.9	16.3	17	15.6	14.9	14.7	14.7	1.49	2.08	2.02	1.72	2.25	1.17	0.94
RA-MW-13A	15	14.6	15.73	14.9	14.5	14.3	13.7	5.21	2.42	3.29	2.83	2.49	2.17	1.66
RA-MW-13B	14.8	14.7	15.4	14.9	14.2	14.3	14.1	3.73	1.38	2.15	2.41	2.16	0.81	0.82
RA-MW-13C	14.2	15	14.9	14.5	14.3	13.8	13.8	3.07	1.82	1.41	1.28	0.71	0.79	0.82
RA-MW-17A	14.3	15.3	16.7	15.1	14.5	13.7	--	1.8	1.8	1.8	1.39	1.18	1.3	--
RA-MW-14A	13.9	14.3	15.3	14.6	14.7	10.8	--	1.43	1.71	1.96	1.08	0.88	0.87	--
RA-MW-14B	14	14.9	15.5	14.5	14.1	12.3	--	1.56	1.21	0.98	1.08	1	0.78	--
RA-MW-16A	14.3	14.9	16	14.9	15.1	13.3	13.4	2.95	1.46	2	1.7	1.07	1.04	1.01
RA-MW-16B	14.3	14.6	16	14.7	13.9	13.7	13.8	2.42	1.19	1.4	1.81	0.92	0.67	0.51
RA-MW-15A	14.3	14.5	15	15	14.7	14.8	14.7	1.88	1.04	1.08	1.3	1.42	1.53	1.44
RA-MW-15B	13.9	14.4	15.4	14.7	14.1	14.0	14.5	0.47	0.86	0.68	0.64	0.91	0.92	0.8
B87-8	14.5	14.7	15.8	15.2	14.7	14.4	14.5	0.26	0.55	0.36	0.29	0.24	0.38	0.27
B85-3	14.6	14.8	15.2	15.8	14.4	14.1	13.6	0.99	0.90	0.98	0.81	0.54	0.74	0.64
W92-16A	14.2	15.6	16.1	15.3	14.0	13.8	14.1	0.33	0.25	0.27	0.23	0.24	0.28	0.28
W92-16B	14.1	14.7	16.2	15.2	13.7	13.7	13.8	1.17	1.37	0.95	0.66	0.09	0.34	0.42
B85-4	14.1	14.4	15.1	14.4	13.9	13.5	14.3	0.41	1.17	0.51	0.71	0.28	0.74	0.33
W97-18A	11.3	11.0	15.0	12.7	13.9	12.0	--	0.11	0.09	0.11	0.08	0.1	0.19	--
W97-18B	11.4	12.4	14.4	13.5	13.0	10.7	--	0.26	0.24	0.27	0.22	0.19	0.19	--
W85-7A	11.4	12.6	14.9	13.9	14.5	12.3	13.7	0.13	0.14	0.21	0.12	0.11	0.1	0.16
W85-7B	12.1	13.0	14.5	13.6	14.1	12.8	13.4	0.28	0.31	0.32	0.01	0.01	0.01	0.02
W97-19A	12.5	13.3	16	14.3	13.8	12.9	--	0.25	0.26	0.28	0.23	0.23	0.19	--
W97-19B	12.7	13.3	15.9	15.3	13.3	12.4	--	0.26	0.26	0.29	0.22	0.06	0.19	--
W98-20A	13.8	12.5	15.4	14.3	14.3	13.1	--	0.16	0.15	0.23	0.12	0.12	0.13	--
W99-R5A	14.2	14.9	15.7	14.8	14.8	14.7	15.1	0.24	0.25	0.24	0.22	0.21	0.2	0.2
W99-R5B	13.9	14.4	15.6	14.4	14.5	13.9	14.7	0.26	0.26	0.27	0.23	0.22	0.22	0.22
W98-21A	13.1	14.3	14.2	13.8	13.9	13.8	13.7	0.16	0.23	0.29	0.45	0.19	0.19	0.22
W98-21B	13.1	13.6	14	13.8	13.7	13.0	13.7	0.24	0.27	0.27	0.25	0.18	0.22	0.21
W85-6A	14.1	14.1	15.5	14			13.7	0.11	0.33	0.34	299			0.23
W85-6B	13.6	13.8	16.3	13.7			13.8	0.31	0.41	0.33	0.26			0.1

Table 3—Comparison of Conventional Parameters (continued)

Well #	DO (mg/L)							pH							ORP (mV)						
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06
RA-MW-12A	0.24	0.09	0.2	0.13	0.04	0	52.7*	8.86	8.73	8.86	8.98	8.41	8.19	8.46	-468	-466	-430	-417	-403	-393	-363
RA-MW-12B	0.27	0.07	0.27	0.07	0.05	1.26	45.1*	7.77	7.83	7.92	8.3	8.68	8.16	7.76	-363	-321	-315	-415	-414	-345	-327
RA-MW-12C	0.2	0.14	0.42	0.25	0.07	1.1	5.16	8.13	7.92	8.09	7.95	8.14	7.89	7.92	-282	-179	-154	-239	-314	-234	-191
RA-MW-11A	0.32	0.10	0.66	6.69	0.16	0	24.2*	7.51	7.53	7	6.52	6.64	6.64	6.46	-384	-391	-316	-110	-241	-246	-216
RA-MW-11B	0.19	0.15	0.5	0.14	0.1	0.19	26.6*	7.66	7.9	7.2	6.7	6.73	7	6.69	-394	-393	-332	-296	-289	-301	-278
RA-MW-13A	1.63	0.17	1.13	0.53	0.11	0.38	0.27	7.15	7.15	7.03	6.7	6.86	6.82	6.82	-155	-102	-97	-94	-204	-176	-93
RA-MW-13B	0.73	0.16	0.73	0.51	0.21	0.45	0.35	7.23	7.56	7.3	6.86	6.99	7.15	6.95	-129	-123	-104	-105	-125	-197	-85
RA-MW-13C	0.22	0.15	0.43	1.4	2.98	0.96	0.41	7.36	7.35	7.44	7.33	7.48	7.25	7.25	-136	-126	-116	-142	-33	-175	-112
RA-MW-17A	0.6	0.19	1.99	0.6	0.2	3.69	--	6.55	6.43	6.61	6.2	6.39	6.5	--	-91	-40	-7	-5	-27	-89	--
RA-MW-14A	0.89	0.22	5.96	0.51	0.22	6.74	--	6.64	6.81	6.99	6.5	6.6	6.6	--	-77	-41	-54	-75	-82	-136	--
RA-MW-14B	1.08	0.10	2.77	0.42	0.12	2.58	--	6.9	7.14	7.33	6.75	6.78	6.87	--	-112	-95	-102	-112	-134	-133	--
RA-MW-16A	0.73	0.27	1.39	1.6	0.11	5.4	0.54	6.61	6.61	6.75	6.42	6.44	6.62	6.44	-94	-45	-58	-156	-103	-160	-93
RA-MW-16B	0.75	0.15	0.86	0.75	0.33	1.85	0.27	6.42	7.12	7.09	6.31	7.12	7.06	6.85	-57	-70	-60	-85	-130	-131	-66
RA-MW-15A	0.33	0.21	1.53	0.47	0.15	8.34	0.47	6.35	6.37	6.74	6.2	6.3	6.47	6.28	-47	4	39	10	-12	-137	-28
RA-MW-15B	0.22	0.10	0.74	0.44	0.18	0.79	0.3	6.35	6.83	7.18	6.39	6.39	6.51	6.26	-5	28	15	17	-11	16	34
B87-8	0.13	1.03	1.06	0.35	0.28	0.53	0.37	6.55	6.31	6.73	6.54	6.68	6.57	6.35	-8	31	17	199	2	73	86
B85-3	1.11	0.16	1.57	4.5	0.12	2.97	0.22	6.49	6.68	6.91	6.39	6.7	6.64	6.42	-7.3	-107	-37	-47	-93	-62	-43
W92-16A	0.98	0.13	2.49	3.1	0.28	0.15	0.45	6.42	6.42	6.72	6.6	6.56	6.6	6.67	1	-14	30	110	110	-32	61
W92-16B	0.14	0.53	1.97	3.4	5.4	1.02	0.54	7.51	7.58	7.63	7.59	6.88	7.54	7.38	-116	-61	-60	73	119	-103	30
B85-4	0.65	1.37	1.5	0.33	0.2	0.22	0.52	6.14	6.26	6.53	6.22	6.51	6.49	6.21	10	41	59	218	-26	75	86
W97-18A	1.27	0.74	1.09	0.5	1.1	4	--	5.83	5.96	6.19	6.17	6.78	6.57	--	32	57	67	103	58	137	--
W97-18B	2.01	5.56	4.52	4.9	2	1.17	--	6.57	6.35	6.67	6.41	6.6	6.16	--	57	63	60	188	83	152	--
W85-7A	4.05	3.17	2.18	4.3	2.2	6.7	5.89	6.24	6.04	6.26	6.2	6.3	6.35	6.24	68	83	57	197	116	113	127
W85-7B	2.78	5.11	6.1	8.7	4	10.3	10.96	6.63	6.51	6.71	5.91	6.18	6.14	6.37	59	73	66	215	132	146	167
W97-19A	4.72	1.79	22.73	4.6	0.97	3.51	--	6.35	6.24	6.28	6.35	6.59	6.41	--	71	94	72	218	69	149	--
W97-19B	1.81	1.31	2.6	2.6	1.1	2.99	--	6.68	6.49	6.3	6.47	6.68	6.68	--	56	86	56	52	76	142	--
W98-20A	4.92	3.76	5.5	5	3.2	5.1	--	6.01	5.91	6.32	5.97	6.29	6.18	--	52	116	84	219	116	171	--
W99-R5A	4.72	4.26	5.6	5.3	3.3	1.83	5.1	6.03	5.98	6.28	6.21	6.22	6.28	6.23	58	96	97	153	123	197	116
W99-R5B	3.97	2.71	4.7	5.1	1.9	2.03	4.2	6.2	6.23	6.55	6.33	6.63	6.55	6.26	58	78	74	201	92	204	111
W98-21A	1.29	1.49	3.03	13.3	1.2	1.05	3.26	5.92	6.07	6.68	6.18	6.3	6.25	6.11	28	69	79	182	113	160	114
W98-21B	1.24	3.29	2.82	17.7	3.9	1.08	3.37	6.04	6.07	6.9	6.24	6.64	6.36	6.07	33	72	47	202	121	161	117
W85-6A	4.92	0.43	0.85	4.9			1.86	6.23	6.22	6.4	6.36			6.25	17	57	86	163			107
W85-6B	3.46	6.13	6.54	5.5			7.87	6.4	6.42	6.68	6.62			8.93	19	76	72	159			79

*: Denotes sulfur interference with dissolved oxygen readings.

Table 3—Comparison of Conventional Parameters (continued)

Well #	Sulfur (mg/L)							Sulfate (mg/L)						
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06
RA-MW-12A														
RA-MW-12B														
RA-MW-12C														
RA-MW-11A	286	296	304	285	460	448	322	620	751	1040	736	1200	3040	993
RA-MW-11B														
RA-MW-13A	743	246	324	372	363	310	213	1960	712	1056	985	971	1980	682
RA-MW-13B														
RA-MW-13C														
RA-MW-17A														
RA-MW-14A	189	228	214	136	122	158	124	477	635	697	357	351	429	396
RA-MW-14B														
RA-MW-16A														
RA-MW-16B														
RA-MW-15A														
RA-MW-15B														
B87-8	9	52	22	17	23	48	21	21	137	73	170	63	125	74
B85-3														
W92-16A														
W92-16B														
B85-4	23	150	31	87	20	103	21	58	410	104	222	50	253	75
W97-18A														
W97-18B														
W85-7A	3	4	5	4	4	3	5	6	9	15	13	8	8	18
W85-7B														
W97-19A														
W97-19B														
W98-20A														
W99-R5A	5	6	4	5	6	7	6	12	12	13	15	13	15	18
W99-R5B														
W98-21A					8	10						19	25	
W98-21B														
W85-6A		15	14	18	--	--	12	5	36	44	44	--	--	35
W85-6B														

Table 4—Frontier Hard Chrome—Event 7Ground Water Elevations 15 June 2006

Well No.	Time	Casing Elevation (feet)	Depth to Water (feet)	Water level Elevation (AMSL)
W85-3A	1857	26.4	14.02	12.38
W85-3B	1854	26.77	14.38	12.39
W97-18A	1756	25.44	12.96	12.48
W97-18B	1758	25.36	12.9	12.46
B85-4	1745	25.38	12.92	12.46
B87-8	1743	25.95	13.51	12.44
W92-16B	1810	25.51	13.08	12.43
W92-16A	1806	25.62	13.18	12.44
B85-3	1835	24.9	12.46	12.44
W85-7A	1239	22.83	10.38	12.45
W85-7B	1235	23	10.49	12.51
W97-19A	1549	22.45	10	12.45
W97-19B	1557	21.72	9.34	12.38
W98-20A	1707	23.57	11.04	12.53
W85-6A	1731	Unknown	13.34	not calculated
W85-6B	1729	Unknown	13.65	not calculated
W98-21B	1724	25.50	13	12.50
W98-21A	1718	25.28	12.75	12.53
W99-R5A	1657	32.26	19.76	12.50
W99-R5B	1659	32.33	19.82	12.51
USGS 14144700 (Stage height of the Columbia River corrected to NGVD 1929)	1800			12.34

[1-]Two different elevation datum's have been used at Frontier Hard Chrome. Weston (12/03) Long-Term Monitoring plan has applied a correction factor (+3.76 feet) using the City of Vancouver's benchmark #108 located near FHC site.

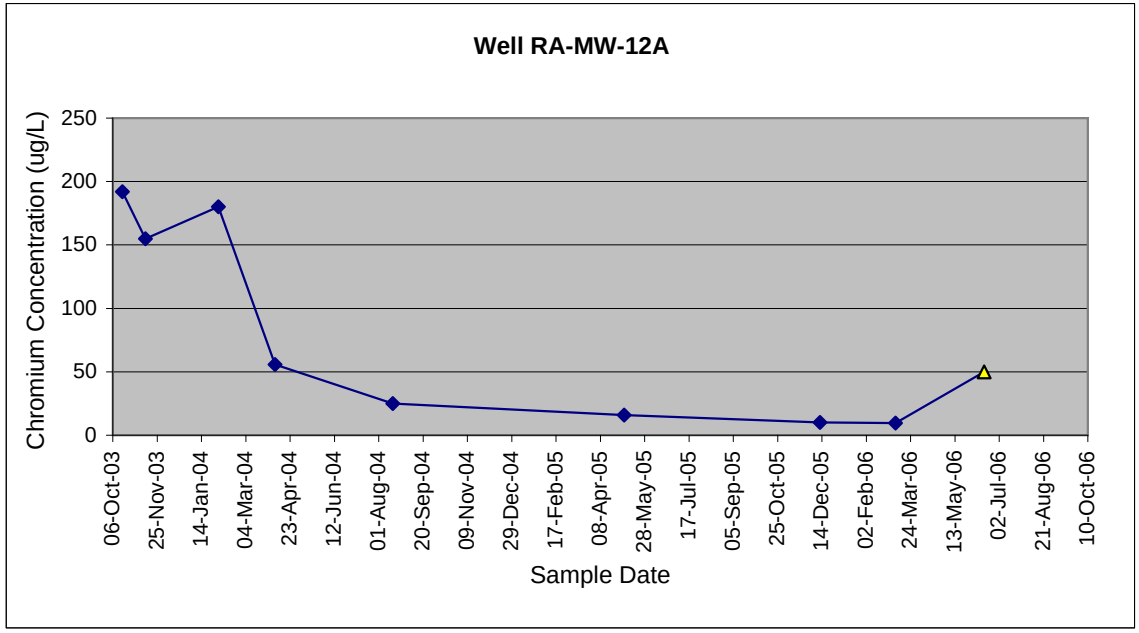
Table 5—Quality Assurance Sample Results - Chromium

Well #	Sample Type	Original Sample Chromium Concentration (mg/L)	Duplicate Sample Chromium Concentration (mg/L)	Relative Percent Difference
RA-MW-12A (filtered)	Field Duplicate	50U	50U	--%
B87-8 (total)	Field Duplicate	21.8	21.0	3.7%

APPENDIX A
GROUNDWATER CHROMIUM CONCENTRATION TRENDS

Well RA-MW-12A

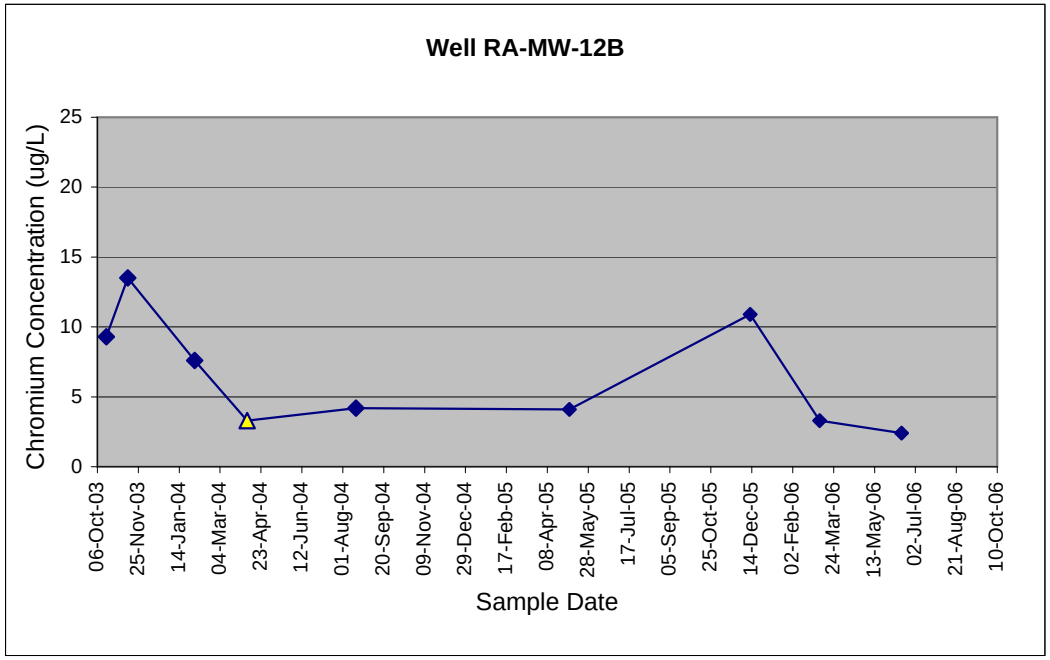
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2524	Water	17-Oct-03	CHROMIUM	192	UG/L		RA-MW-12A	Dissolved	>10
MJ27F5	Water	12-Nov-03	CHROMIUM	155	UG/L		RA-MW-12A	Dissolved	>10
MJ2AF0	Water	02-Feb-04	CHROMIUM	180	UG/L		RA-MW-12A	Total	7
MJ2BH9	Water	06-Apr-04	CHROMIUM	55.8	UG/L		RA-MW-12A	Dissolved	17
MJ4725	Water	17-Aug-04	CHROMIUM	24.9	UG/L		RA-MW-12A	Dissolved	12
184253	Water	5-May-05	CHROMIUM	16	UG/L		RA-MW-12A	Dissolved	32
05504282	Water	12-Dec-05	CHROMIUM	10.2	UG/L		RA-MW-12A	Dissolved	86
104243	Water	7-Mar-06	CHROMIUM	9.6	UG/L		RA-MW-12A	Dissolved	60
244313	Water	15-Jun-06	CHROMIUM	50	UG/L	U	RA-MW-12A	Dissolved	47



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-12B

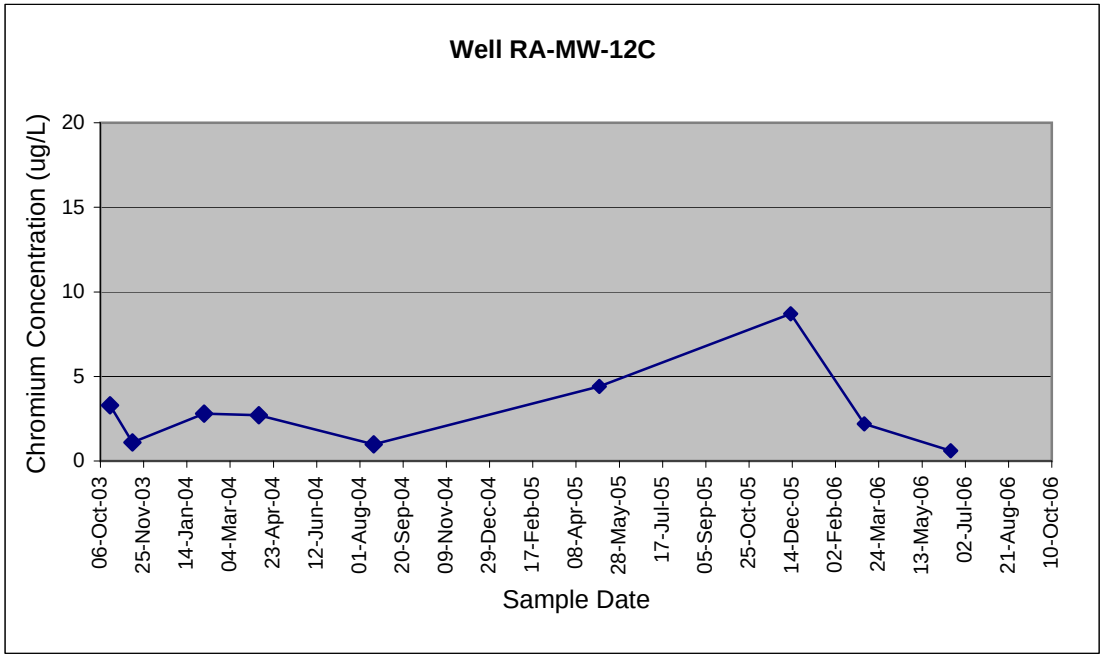
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2526	Water	17-Oct-03	CHROMIUM	9.3	UG/L	BJ	RA-MW-12B	Dissolved	>10
MJ27F7	Water	12-Nov-03	CHROMIUM	13.5	UG/L		RA-MW-12B	Dissolved	>10
MJ2AF1	Water	02-Feb-04	CHROMIUM	7.6	UG/L	J	RA-MW-12B	Total	6
MJ2BJ0	Water	06-Apr-04	CHROMIUM	3.3	UG/L	U	RA-MW-12B	Total	0
MJ4726	Water	17-Aug-04	CHROMIUM	4.2	UG/L	J	RA-MW-12B	Total	2
184254	Water	5-May-05	CHROMIUM	4.1	UG/L		RA-MW-12B	Total	4.5
05504283	Water	12-Dec-05	CHROMIUM	10.9	UG/L		RA-MW-12B	Total	8
104242	Water	7-Mar-06	CHROMIUM	3.3	UG/L		RA-MW-12B	Total	1.7
244315	Water	15-Jun-06	CHROMIUM	2.4	UG/L		RA-MW-12B	Total	14



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-12C

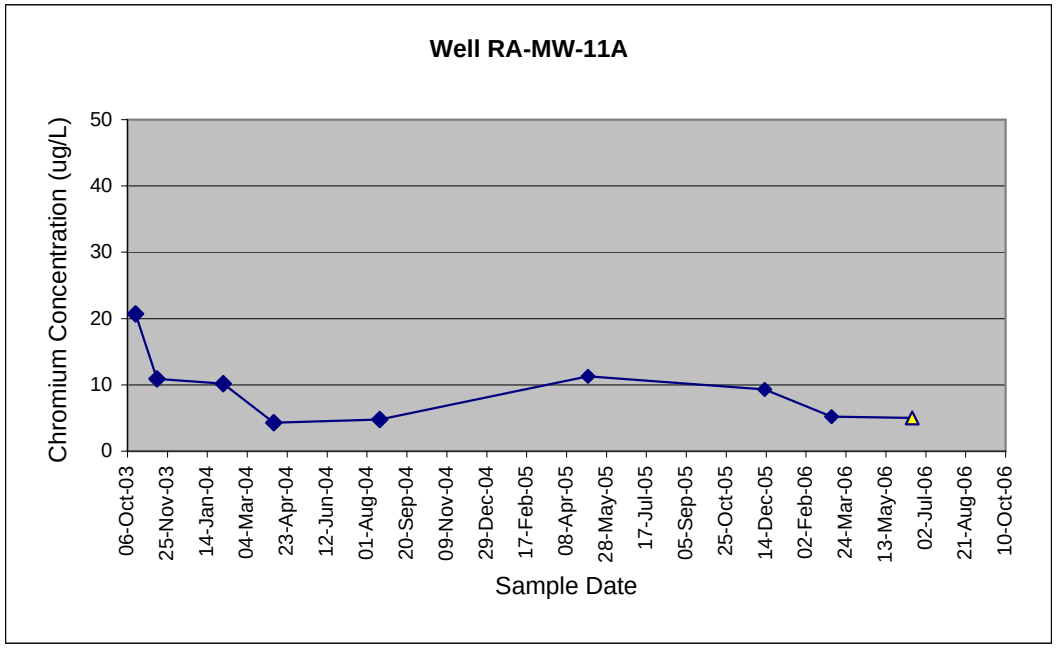
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2528	Water	17-Oct-03	CHROMIUM	3.3	UG/L	BJ	RA-MW-12C	Dissolved	>10
MJ27F9	Water	12-Nov-03	CHROMIUM	1.1	UG/L	BJ	RA-MW-12C	Dissolved	>10
MJ2AF2	Water	03-Feb-04	CHROMIUM	2.8	UG/L	J	RA-MW-12C	Total	1
MJ2BJ1	Water	06-Apr-04	CHROMIUM	2.7	UG/L	J	RA-MW-12C	Total	0
MJ4727	Water	17-Aug-04	CHROMIUM	0.98	UG/L	J	RA-MW-12C	Total	2
184255	Water	5-May-05	CHROMIUM	4.4	UG/L		RA-MW-12C	Total	5.2
05504284	Water	12-Dec-05	CHROMIUM	8.7	UG/L		RA-MW-12C	Total	3
104245	Water	7-Mar-06	CHROMIUM	2.2	UG/L		RA-MW-12C	Total	1
244317	Water	15-Jun-06	CHROMIUM	0.6	UG/L	J	RA-MW-12C	Total	0.3



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-11A

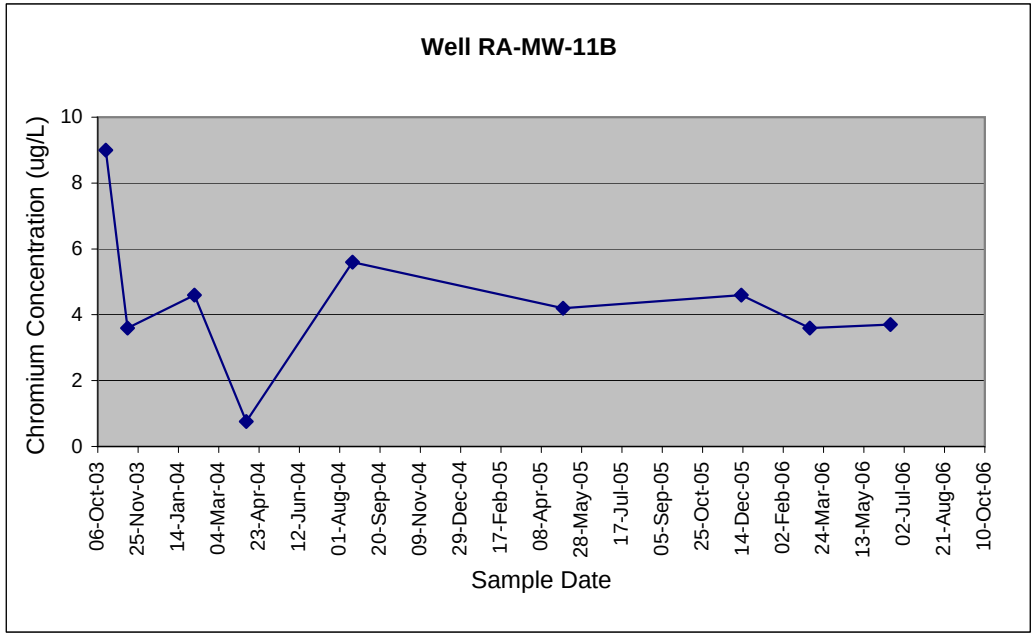
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2516	Water	16-Oct-03	CHROMIUM	20.7	UG/L		RA-MW-11A	Dissolved	>10
MJ27G1	Water	12-Nov-03	CHROMIUM	10.9	UG/L	J	RA-MW-11A	Dissolved	>10
MJ2AF4	Water	03-Feb-04	CHROMIUM	10.2	UG/L		RA-MW-11A	Dissolved	800
MJ2BJ3	Water	06-Apr-04	CHROMIUM	4.3	UG/L	J	RA-MW-11A	Dissolved	783
MJ4728	Water	17-Aug-04	CHROMIUM	4.8	UG/L	J	RA-MW-11A	Total	<10
184250	Water	5-May-05	CHROMIUM	11.3	UG/L		RA-MW-11A	Total	2
05504280	Water	12-Dec-05	CHROMIUM	9.3	UG/L		RA-MW-11A	Total	4
104232	Water	6-Mar-06	CHROMIUM	5.2	UG/L		RA-MW-11A	Total	1
244318	Water	15-Jun-06	CHROMIUM	5	UG/L	UJ	RA-MW-11A	Total	2



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-11B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2518	Water	16-Oct-03	CHROMIUM	9	UG/L	BJ	RA-MW-11B	Dissolved	>10
MJ27G3	Water	12-Nov-03	CHROMIUM	3.6	UG/L	BJ	RA-MW-11B	Dissolved	>10
MJ2AF6	Water	03-Feb-04	CHROMIUM	4.6	UG/L	J	RA-MW-11B	Dissolved	550
MJ2BJ5	Water	7-Apr-04	CHROMIUM	0.76	UG/L	J	RA-MW-11B	Dissolved	1100
MJ4730	Water	17-Aug-04	CHROMIUM	5.6	UG/L	J	RA-MW-11B	Total	114
184251	Water	5-May-05	CHROMIUM	4.2	UG/L		RA-MW-11B	Total	7.1
05504281	Water	12-Dec-05	CHROMIUM	4.6	UG/L		RA-MW-11B	Dissolved	13
104241	Water	7-Mar-06	CHROMIUM	3.6	UG/L		RA-MW-11B	Total	5
244319	Water	15-Jun-06	CHROMIUM	3.7	UG/L		RA-MW-11B	Total	3

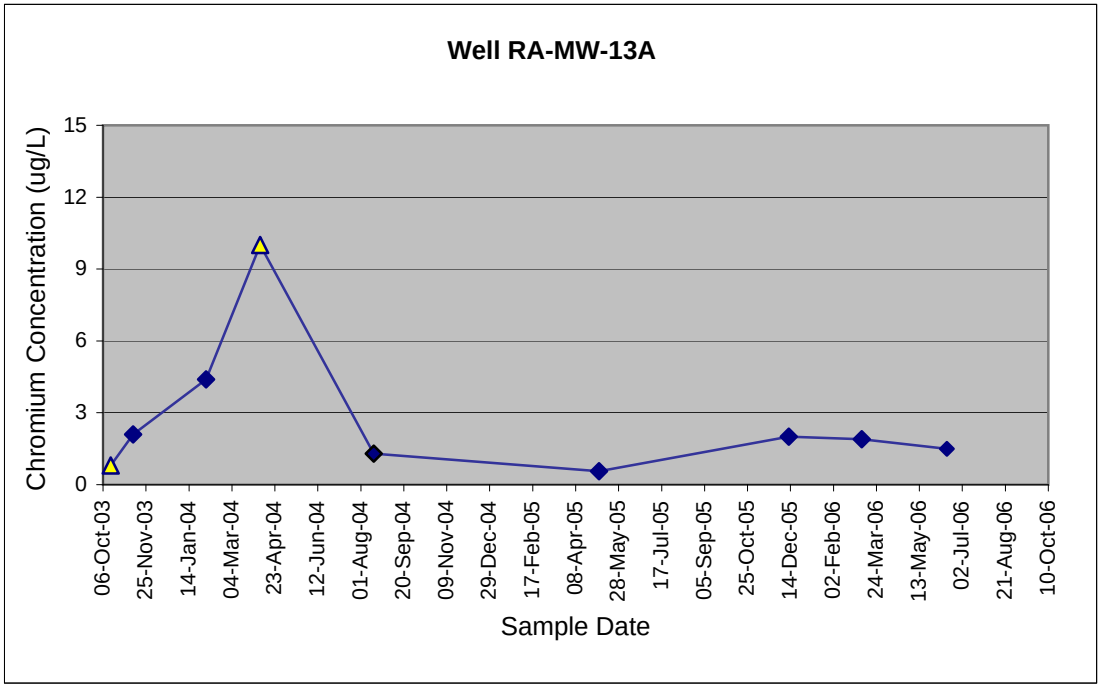


Note: The total Cr concentration was used for the August 2004 event because the dissolved concentration had a higher detection limit (10U).

Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

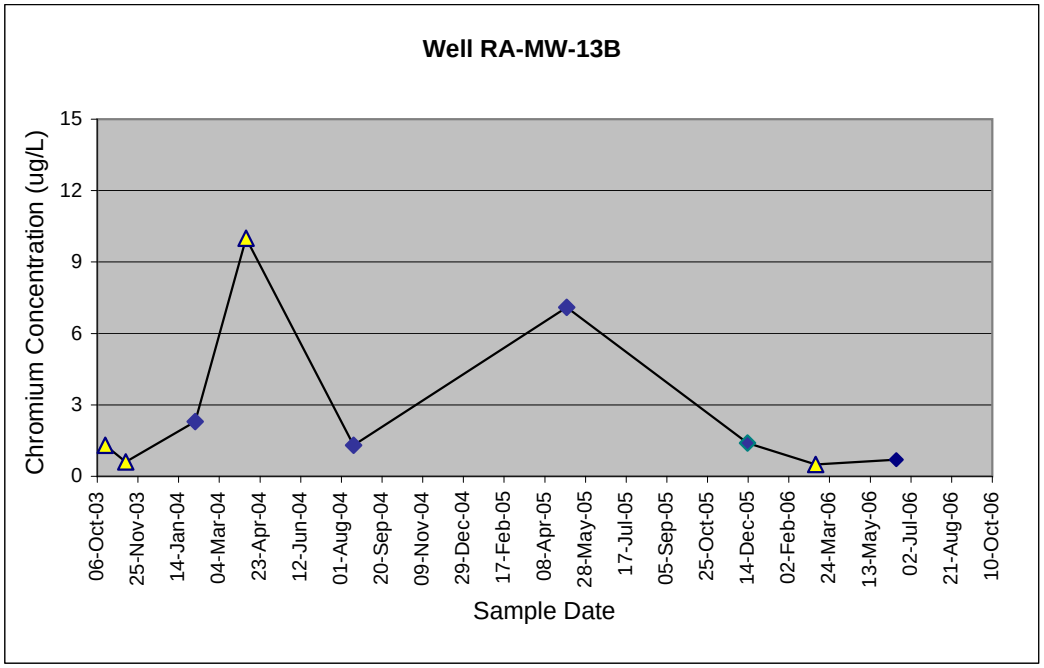
Well RA-MW-13A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2508	Water	15-Oct-03	CHROMIUM	0.8	UG/L	U	RA-MW-13A	Total	<10
MJ27E2	Water	10-Nov-03	CHROMIUM	2.1	UG/L	BJ	RA-MW-13A	Total	>10
MJ2AG1	Water	03-Feb-04	CHROMIUM	4.4	UG/L	J	RA-MW-13A	Total	4
MJ2BH4	Water	6-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-13A	Total	7
MJ4718	Water	16-Aug-04	CHROMIUM	1.3	UG/L	J	RA-MW-13A	Total	9
184261	Water	5-May-05	CHROMIUM	0.56	UG/L		RA-MW-13A	Total	6.4
05504285	Water	12-Dec-05	CHROMIUM	2	UG/L		RA-MW-13A	Total	6.4
104246	Water	7-Mar-06	CHROMIUM	1.9	UG/L		RA-MW-13A	Total	4
244301	Water	14-Jun-06	CHROMIUM	1.5	UG/L		RA-MW-13A	Total	0.7



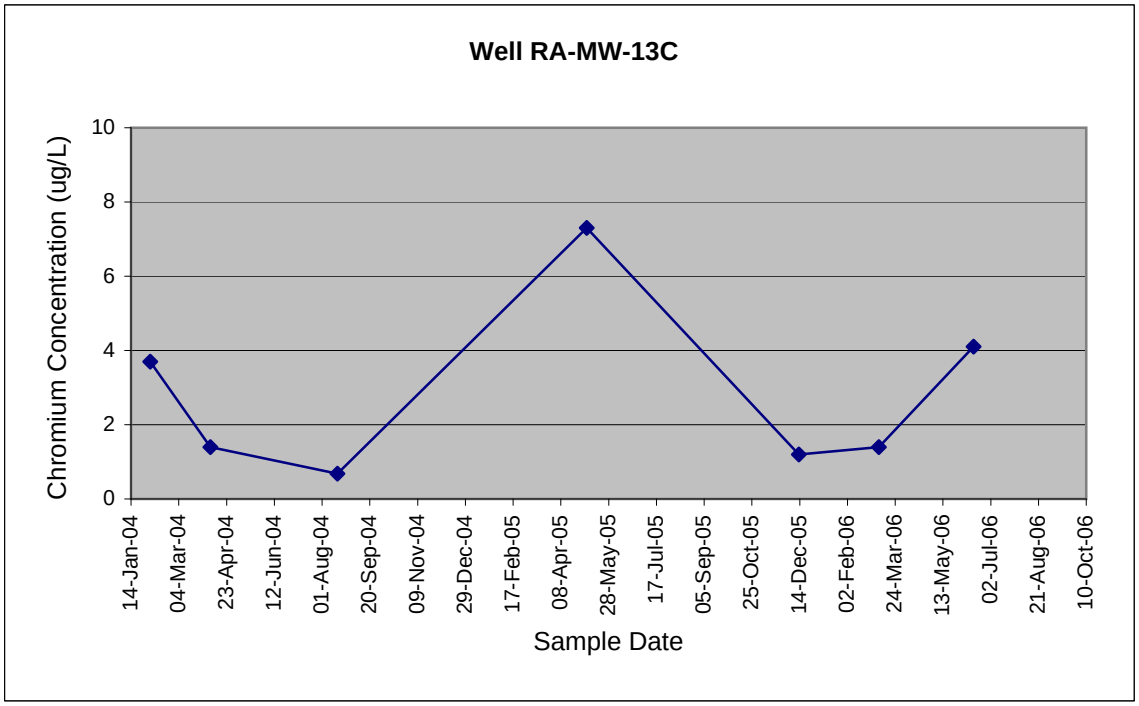
Well RA-MW-13B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2509	Water	16-Oct-03	CHROMIUM	1.3	UG/L	U	RA-MW-13B	Total	<10
MJ27E3	Water	10-Nov-03	CHROMIUM	0.6	UG/L	UJ	RA-MW-13B	Total	<10
MJ2AF8	Water	03-Feb-04	CHROMIUM	2.3	UG/L	J	RA-MW-13B	Total	3
MJ2BH5	Water	6-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-13B	Total	1
MJ4720	Water	16-Aug-04	CHROMIUM	1.3	UG/L	J	RA-MW-13B	Total	2
184262	Water	5-May-05	CHROMIUM	7.1	UG/L		RA-MW-13B	Total	2.8
05504286	Water	13-Dec-05	CHROMIUM	1.4	UG/L		RA-MW-13B	Total	1.7
104247	Water	7-Mar-06	CHROMIUM	0.5	UG/L	U	RA-MW-13B	Total	0
244302	Water	14-Jun-06	CHROMIUM	0.7	UG/L		RA-MW-13B	Total	0.8



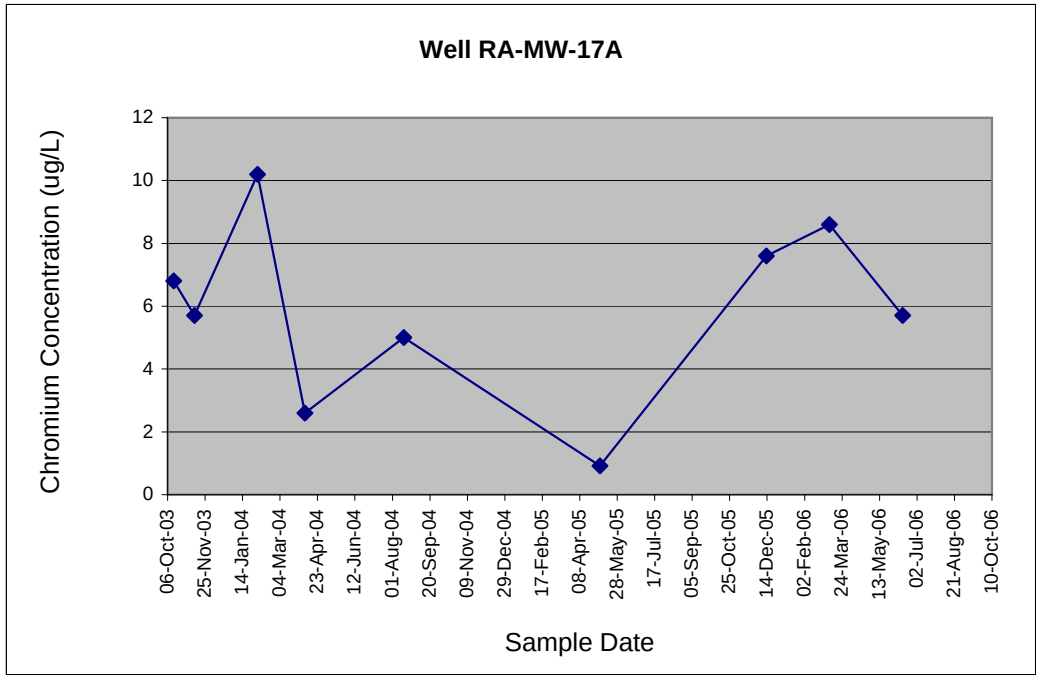
Well RA-MW-13C

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AF9	Water	03-Feb-04	CHROMIUM	3.7	UG/L	J	RA-MW-13C	Total	2
MJ2BH6	Water	6-Apr-04	CHROMIUM	1.4	UG/L	J	RA-MW-13C	Total	0
MJ4721	Water	17-Aug-04	CHROMIUM	0.68	UG/L	J	RA-MW-13C	Total	2
184263	Water	5-May-05	CHROMIUM	7.3	UG/L		RA-MW-13C	Total	9.8
05504287	Water	13-Dec-05	CHROMIUM	1.2	UG/L		RA-MW-13C	Total	0.1
104248	Water	7-Mar-06	CHROMIUM	1.4	UG/L		RA-MW-13C	Total	6
244303	Water	14-Jun-06	CHROMIUM	4.1	UG/L		RA-MW-13C	Total	5



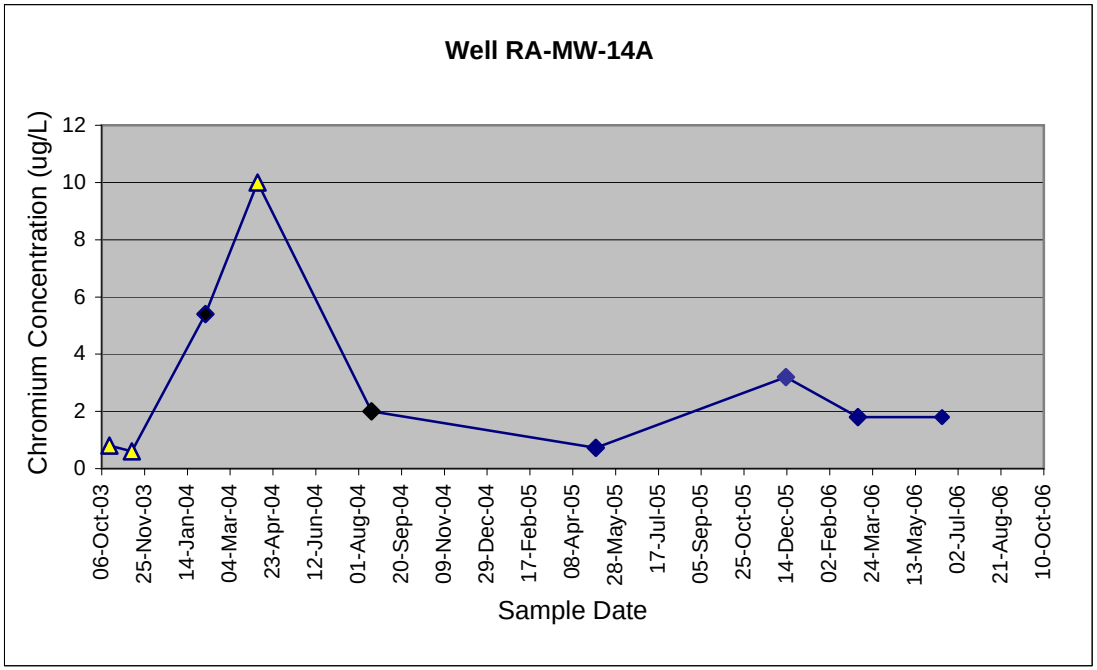
Well RA-MW-17A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2501	Water	14-Oct-03	CHROMIUM	6.8	UG/L	BJ	RA-MW-17A	Total	<10
MJ27E5	Water	11-Nov-03	CHROMIUM	5.7	UG/L	BJ	RA-MW-17A	Total	<10
MJ2AG0	Water	03-Feb-04	CHROMIUM	10.2	UG/L	J	RA-MW-17A	Total	1
MJ2BH7	Water	6-Apr-04	CHROMIUM	2.6	UG/L	J	RA-MW-17A	Total	0
MJ4715	Water	16-Aug-04	CHROMIUM	5	UG/L	J	RA-MW-17A	Total	1
184260	Water	5-May-05	CHROMIUM	0.92	UG/L		RA-MW-17A	Total	10
05504299	Water	13-Dec-05	CHROMIUM	7.6	UG/L		RA-MW-17A	Total	3.1
104240	Water	7-Mar-06	CHROMIUM	8.6	UG/L		RA-MW-17A	Total	7
244293	Water	13-Jun-06	CHROMIUM	5.7	UG/L		RA-MW-17A	Total	1



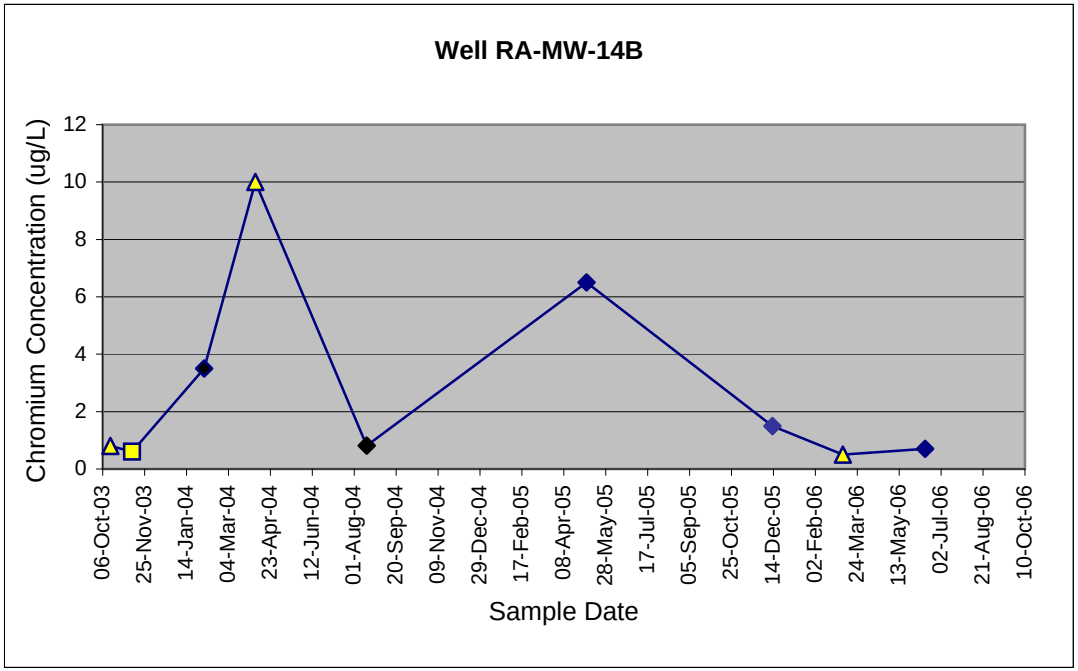
Well RA-MW-14A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2504	Water	15-Oct-03	CHROMIUM	0.8	UG/L	U	RA-MW-14A	Total	<10
MJ27D8	Water	10-Nov-03	CHROMIUM	0.6	UG/L	UJ	RA-MW-14A	Total	<10
MJ2AG2	Water	04-Feb-04	CHROMIUM	5.4	UG/L	J	RA-MW-14A	Total	0
MJ2BG5	Water	5-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-14A	Total	5
MJ4712	Water	16-Aug-04	CHROMIUM	2	UG/L	J	RA-MW-14A	Total	3
184258	Water	5-May-05	CHROMIUM	0.73	UG/L		RA-MW-14A	Total	7.5
05504294	Water	13-Dec-05	CHROMIUM	3.2	UG/L		RA-MW-14A	Total	1.5
104250	Water	7-Mar-06	CHROMIUM	1.8	UG/L		RA-MW-14A	Total	1
244294	Water	13-Jun-06	CHROMIUM	1.8	UG/L		RA-MW-14A	Total	1



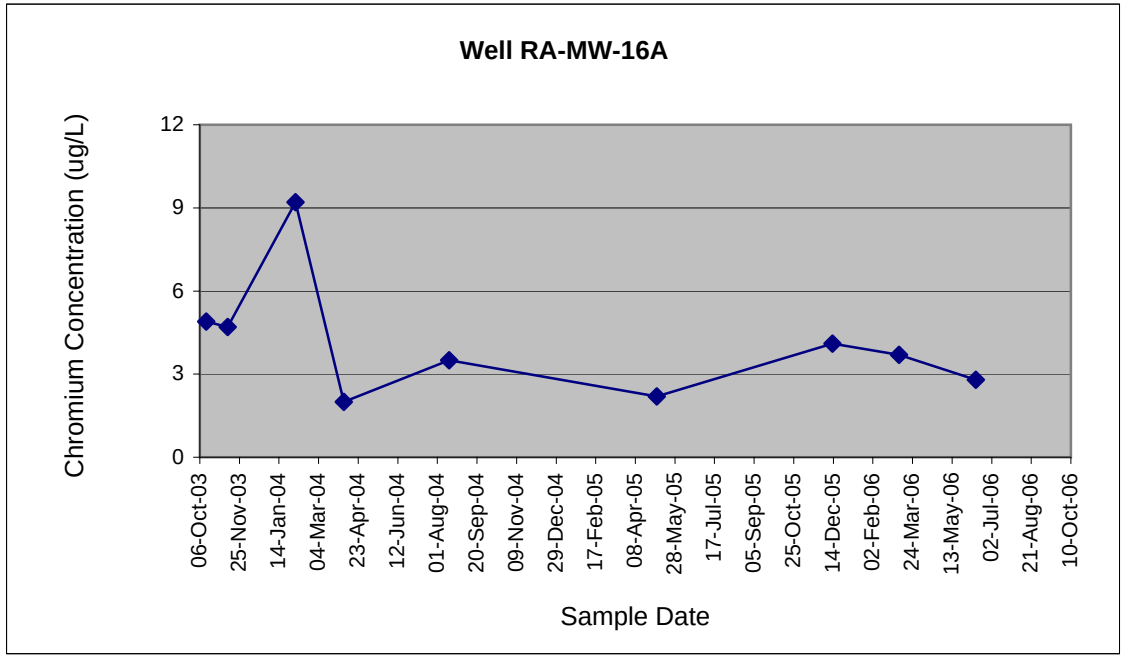
Well RA-MW-14B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2505	Water	15-Oct-03	CHROMIUM	0.8	UG/L	U	RA-MW-14B	Total	<10
MJ27D9	Water	10-Nov-03	CHROMIUM	0.6	UG/L	R	RA-MW-14B	Total	<10
MJ2AG4	Water	04-Feb-04	CHROMIUM	3.5	UG/L	J	RA-MW-14B	Total	1
MJ2BG7	Water	5-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-14B	Total	0
MJ4714	Water	16-Aug-04	CHROMIUM	0.81	UG/L	J	RA-MW-14B	Total	2
184259	Water	5-May-05	CHROMIUM	6.5	UG/L		RA-MW-14B	Total	5.6
05504295	Water	13-Dec-05	CHROMIUM	1.5	UG/L		RA-MW-14B	Total	6.1
104249	Water	7-Mar-06	CHROMIUM	0.5	UG/L	U	RA-MW-14B	Total	4
244295	Water	13-Jun-06	CHROMIUM	0.7	UG/L		RA-MW-14B	Total	9



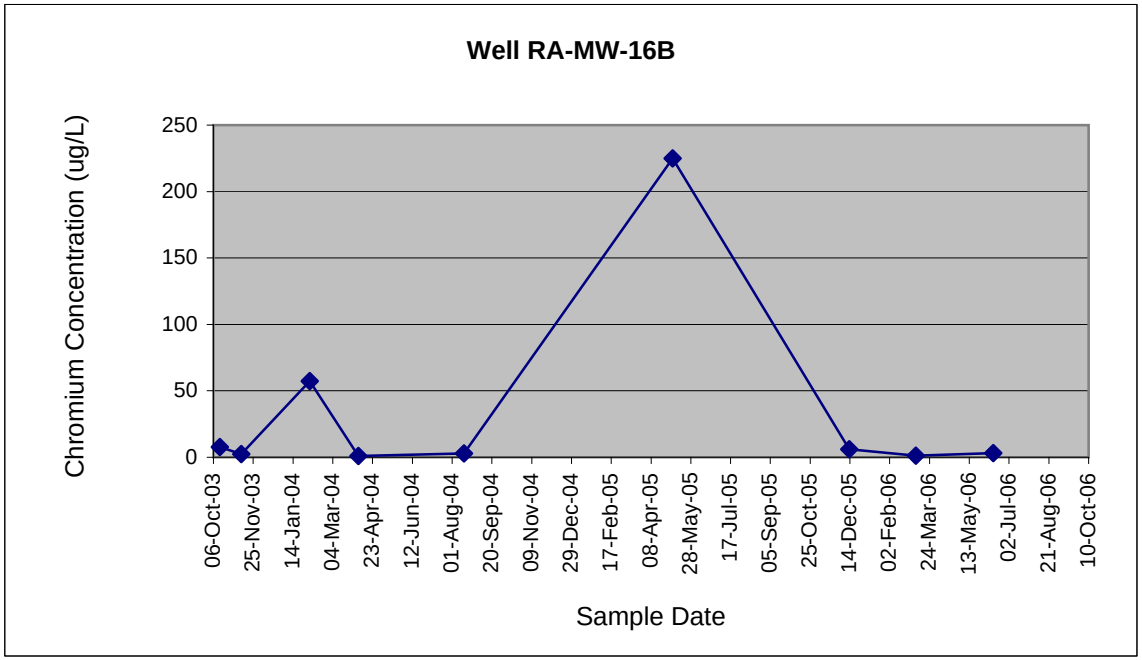
Well RA-MW-16A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2502	Water	14-Oct-03	CHROMIUM	4.9	UG/L	BJ	RA-MW-16A	Total	<10
MJ27E0	Water	10-Nov-03	CHROMIUM	4.7	UG/L	BJ	RA-MW-16A	Total	<10
MJ2AG5	Water	04-Feb-04	CHROMIUM	9.2	UG/L	J	RA-MW-16A	Total	1
MJ2BG8	Water	5-Apr-04	CHROMIUM	2	UG/L	J	RA-MW-16A	Total	1
MJ4716	Water	16-Aug-04	CHROMIUM	3.5	UG/L	J	RA-MW-16A	Total	2
184257	Water	5-May-05	CHROMIUM	2.2	UG/L		RA-MW-16A	Total	8.5
05504293	Water	13-Dec-05	CHROMIUM	4.1	UG/L		RA-MW-16A	Total	1.2
104238	Water	7-Mar-06	CHROMIUM	3.7	UG/L		RA-MW-16A	Total	1.7
244304	Water	12-Jun-06	CHROMIUM	2.8	UG/L		RA-MW-16A	Total	1



Well RA-MW-16B

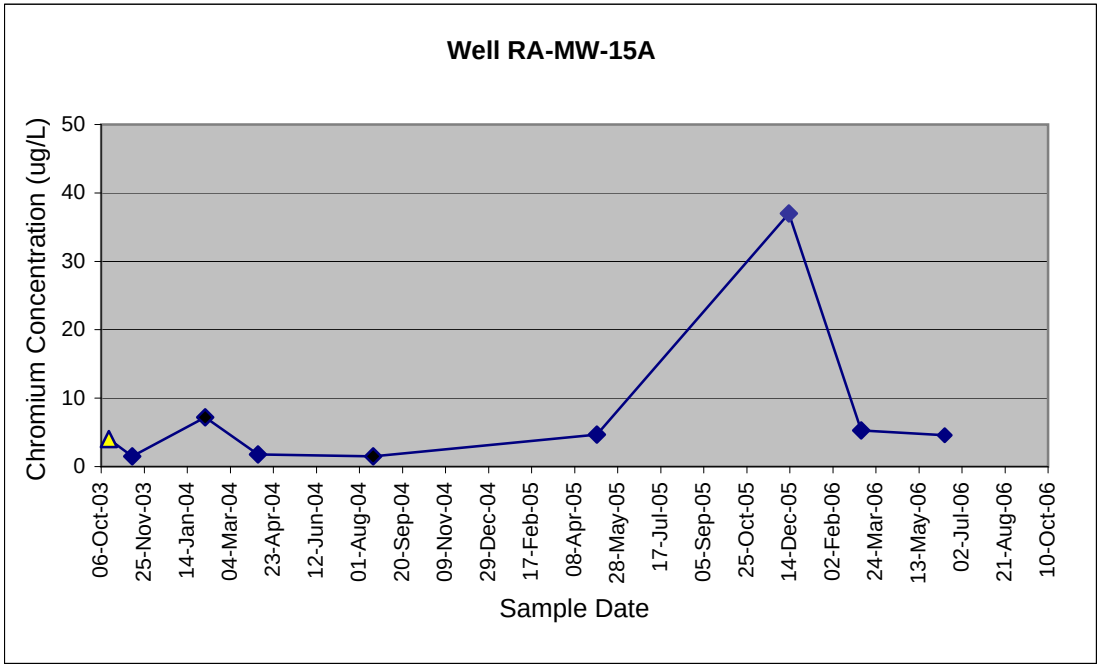
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2503	Water	14-Oct-03	CHROMIUM	7.6	UG/L	BJ	RA-MW-16B	Total	<10
MJ27E1	Water	10-Nov-03	CHROMIUM	2.5	UG/L	BJ	RA-MW-16B	Total	<10
MJ2AG6	Water	04-Feb-04	CHROMIUM	57.4	UG/L	BJ	RA-MW-16B	Total	1
MJ2BH0	Water	5-Apr-04	CHROMIUM	1	UG/L	J	RA-MW-16B	Dissolved	0
MJ4717	Water	16-Aug-04	CHROMIUM	2.8	UG/L	J	RA-MW-16B	Total	3.6
184256	Water	5-May-05	CHROMIUM	225	UG/L		RA-MW-16B	Total	5.7
05504291	Water	13-Dec-05	CHROMIUM	6.1	UG/L		RA-MW-16B	Dissolved	3.9
104239	Water	7-Mar-06	CHROMIUM	1.3	UG/L		RA-MW-16B	Total	0
244305	Water	12-Jun-06	CHROMIUM	3.2	UG/L		RA-MW-16B	Total	0.3



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

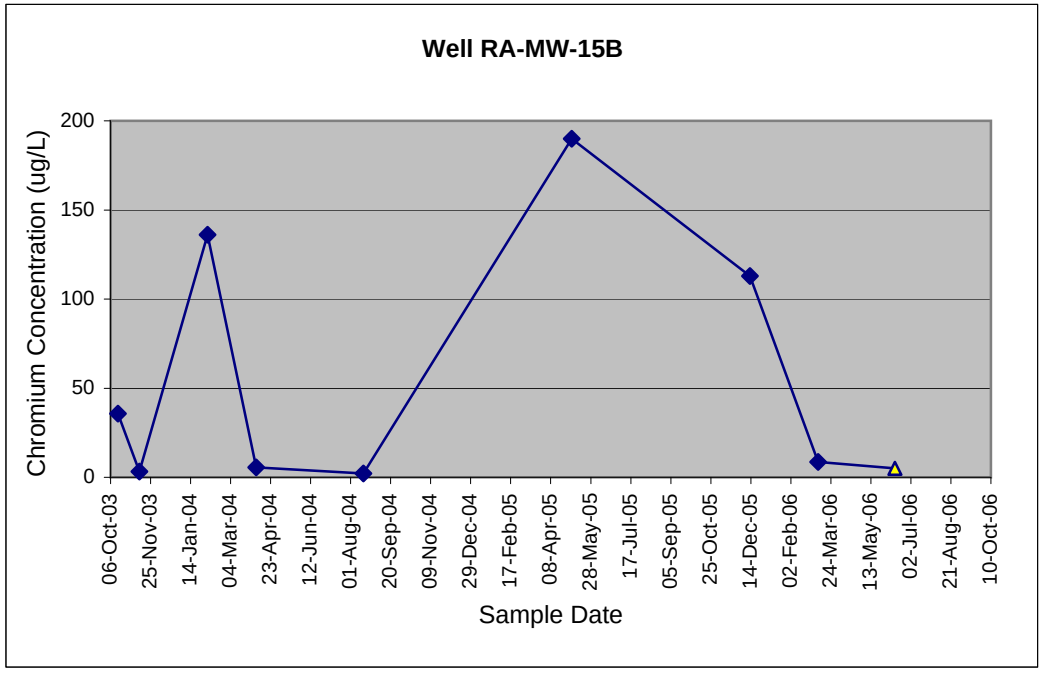
Well RA-MW-15A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2506	Water	15-Oct-03	CHROMIUM	4	UG/L	U	RA-MW-15A	Total	<10
MJ27E8	Water	11-Nov-03	CHROMIUM	1.5	UG/L	BJ	RA-MW-15A	Total	<10
MJ2AG7	Water	04-Feb-04	CHROMIUM	7.2	UG/L	J	RA-MW-15A	Total	1
MJ2BH1	Water	5-Apr-04	CHROMIUM	1.8	UG/L	J	RA-MW-15A	Total	0
MJ4722	Water	17-Aug-04	CHROMIUM	1.5	UG/L	J	RA-MW-15A	Total	0
184248	Water	4-May-05	CHROMIUM	4.7	UG/L		RA-MW-15A	Total	2
05504290	Water	13-Dec-05	CHROMIUM	37	UG/L		RA-MW-15A	Total	1.3
104251	Water	7-Mar-06	CHROMIUM	5.3	UG/L		RA-MW-15A	Total	0
244290	Water	12-Jun-06	CHROMIUM	4.6	UG/L		RA-MW-15A	Total	0.6



Well RA-MW-15B

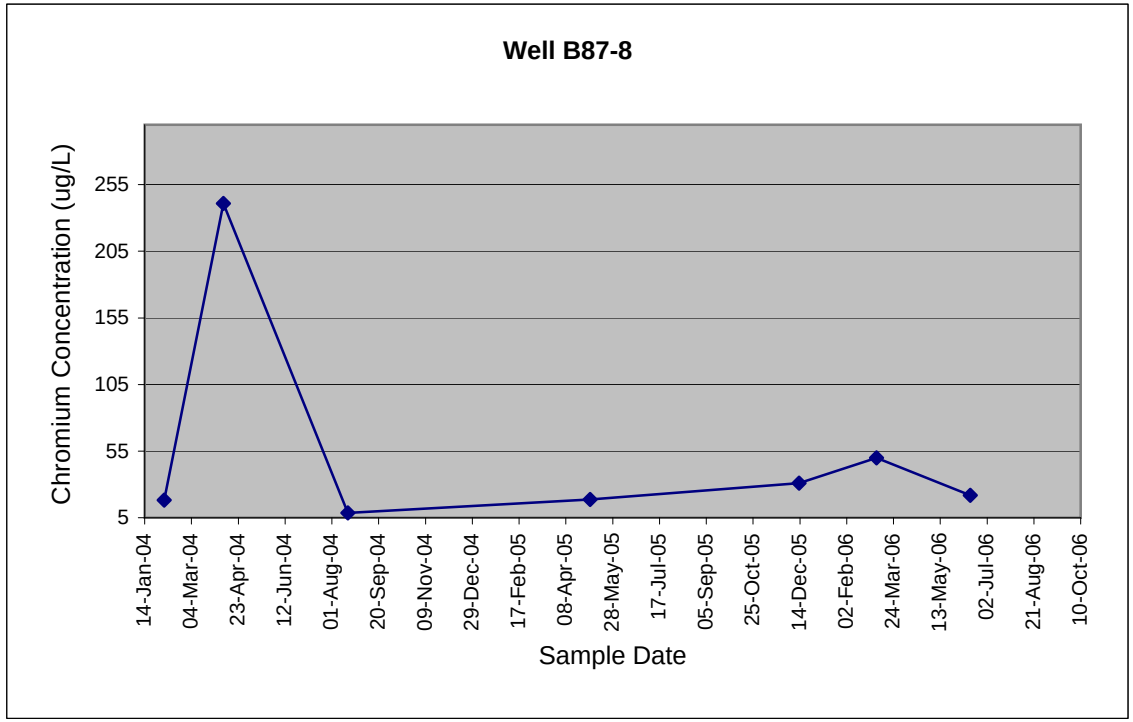
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2507	Water	15-Oct-03	CHROMIUM	35.8	UG/L		RA-MW-15B	Total	<10
MJ27E9	Water	11-Nov-03	CHROMIUM	3.2	UG/L	BJ	RA-MW-15B	Total	<10
MJ2AG8	Water	04-Feb-04	CHROMIUM	136	UG/L		RA-MW-15B	Total	2
MJ2BH2	Water	5-Apr-04	CHROMIUM	5.5	UG/L	J	RA-MW-15B	Total	0
MJ4723	Water	17-Aug-04	CHROMIUM	2.2	UG/L	J	RA-MW-15B	Total	1
184249	Water	4-May-05	CHROMIUM	190	UG/L		RA-MW-15B	Total	9.7
05504288	Water	13-Dec-05	CHROMIUM	113	UG/L		RA-MW-15B	Total	3.5
104252	Water	8-Mar-06	CHROMIUM	8.7	UG/L		RA-MW-15B	Dissolved	5
244292	Water	12-Jun-06	CHROMIUM	5	UG/L	U	RA-MW-15B	Dissolved	4



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well B87-8

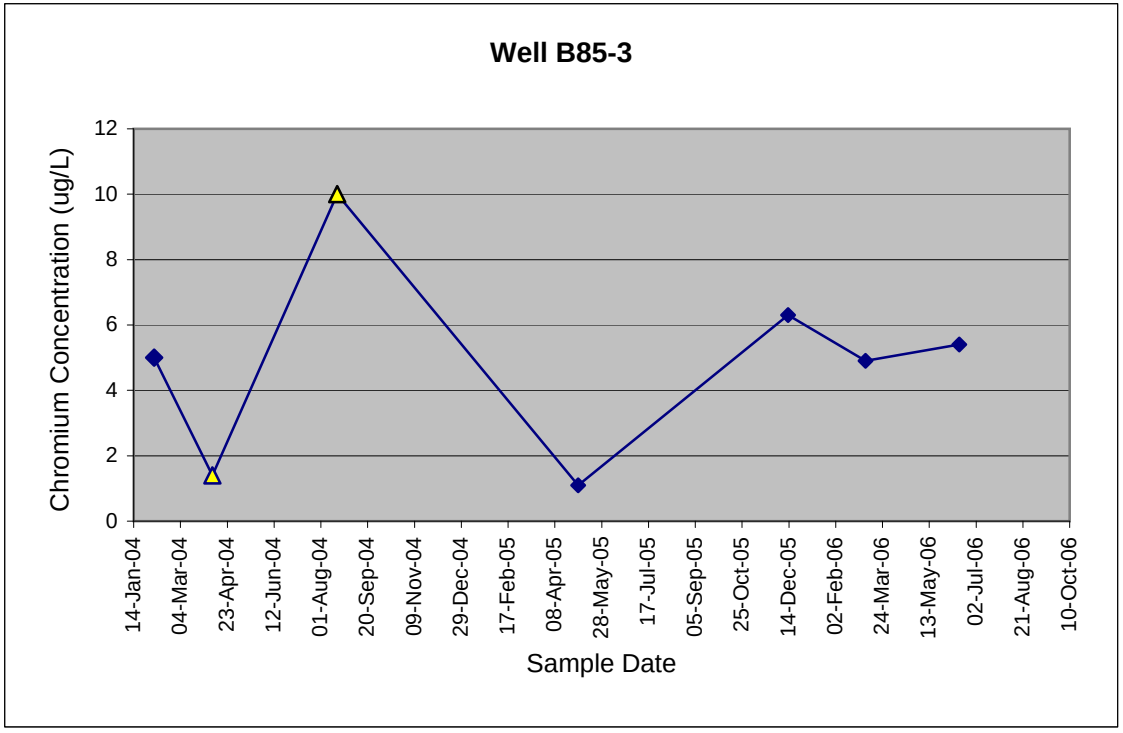
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AG9	Water	04-Feb-04	CHROMIUM	18.2	UG/L		B87-8	Total	2
MJ2BK0	Water	7-Apr-04	CHROMIUM	241	UG/L		B87-8	Total	8
MJ4737	Water	18-Aug-04	CHROMIUM	8.5	UG/L	J	B87-8	Dissolved	36
184247	Water	4-May-05	CHROMIUM	18.8	UG/L		B87-8	Total	6.5
05504297	Water	13-Dec-05	CHROMIUM	31	UG/L		B87-8	Total	5.1
104236	Water	6-Mar-06	CHROMIUM	50	UG/L		B87-8	Total	8
244308	Water	14-Jun-06	CHROMIUM	21.8	UG/L		B87-8	Total	3



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

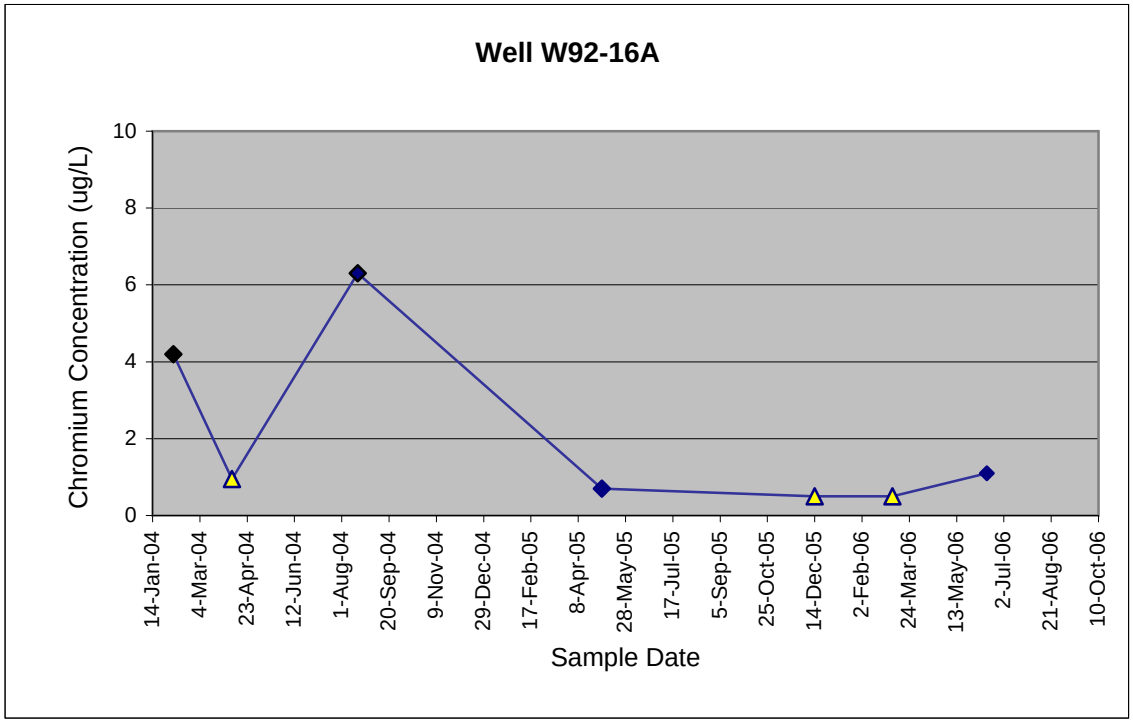
Well B85-3

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH0	Water	05-Feb-04	CHROMIUM	5	UG/L	J	B85-3	Total	1
MJ2BJ6	Water	7-Apr-04	CHROMIUM	1.4	UG/L	U	B85-3	Total	3
MJ4732	Water	18-Aug-04	CHROMIUM	10	UG/L	U	B85-3	Total	0
184232	Water	3-May-05	CHROMIUM	1.1	UG/L		B85-3	Total	2.8
05504298	Water	13-Dec-05	CHROMIUM	6.3	UG/L		B85-3	Total	8.1
104235	Water	6-Mar-06	CHROMIUM	4.9	UG/L		B85-3	Total	7
244311	Water	14-Jun-06	CHROMIUM	5.4	UG/L		B85-3	Total	6



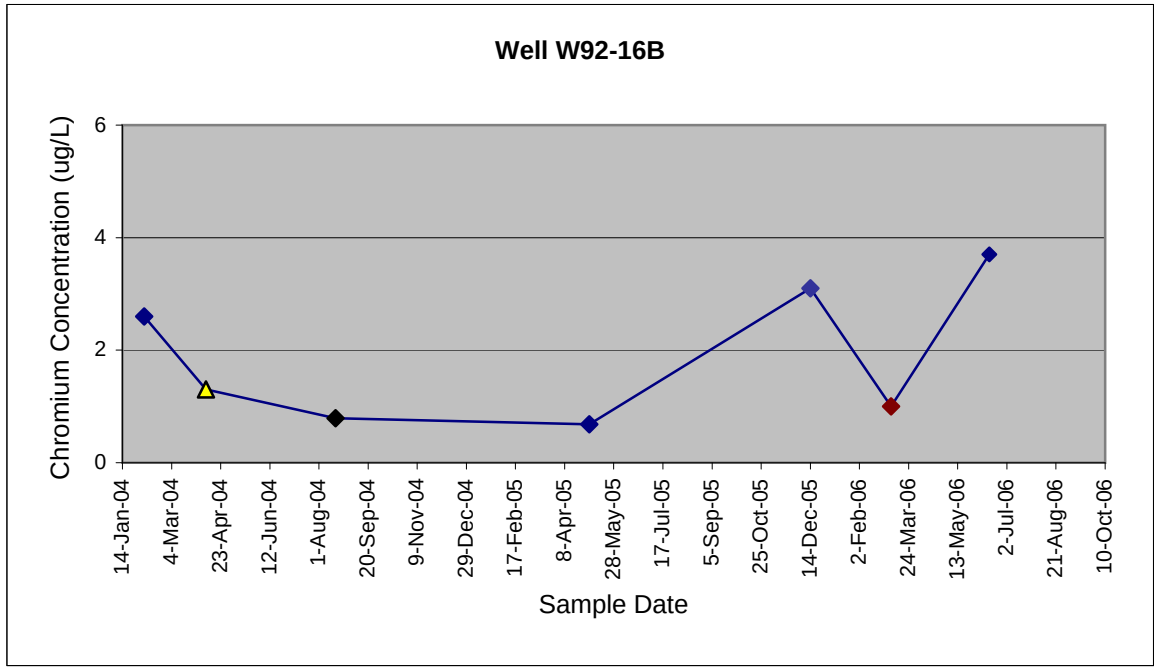
Well W92-16A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH1	Water	05-Feb-04	CHROMIUM	4.2	UG/L	J	W92-16A	Total	2
MJ2BJ7	Water	7-Apr-04	CHROMIUM	0.95	UG/L	U	W92-16A	Total	0
MJ4734	Water	18-Aug-04	CHROMIUM	6.3	UG/L	J	W92-16A	Total	0
184234	Water	3-May-05	CHROMIUM	0.7	UG/L		W92-16A	Total	0.7
05504311	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W92-16A	Total	0.7
104234	Water	6-Mar-06	CHROMIUM	0.5	UG/L	U	W92-16A	Total	0.7
244304	Water	14-Jun-06	CHROMIUM	1.1	UG/L		W92-16A	Total	2



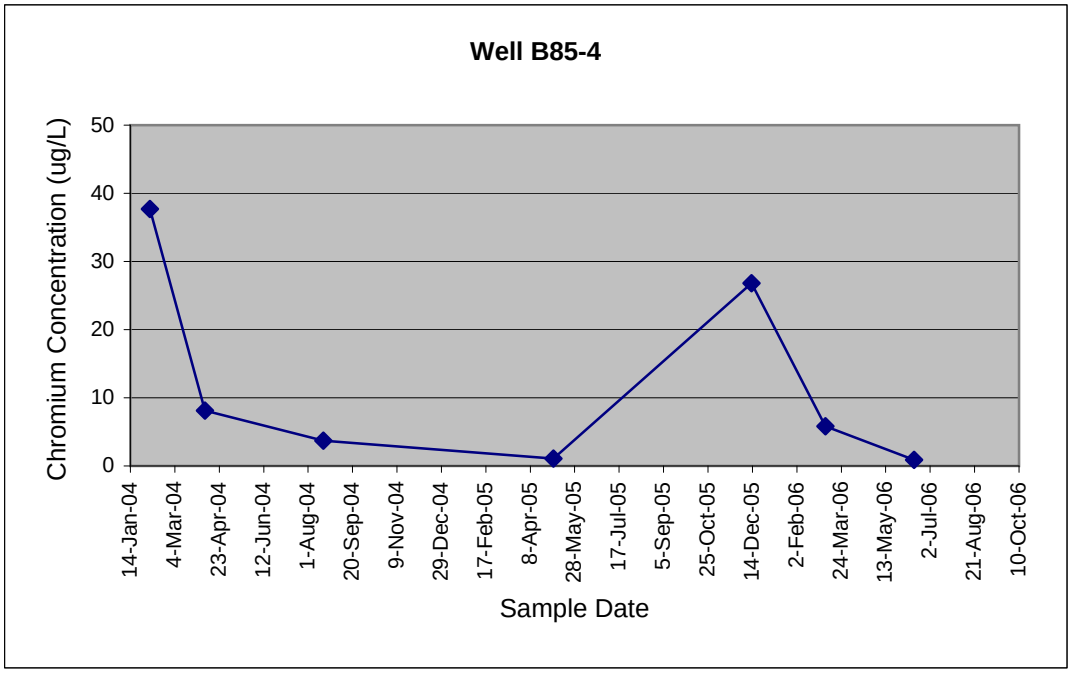
Well W92-16B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH3	Water	05-Feb-04	CHROMIUM	2.6	UG/L	J	W92-16B	Total	7
MJ2BJ8	Water	7-Apr-04	CHROMIUM	1.3	UG/L	U	W92-16B	Total	2
MJ4735	Water	18-Aug-04	CHROMIUM	0.79	UG/L	J	W92-16B	Total	<10
184233	Water	3-May-05	CHROMIUM	0.68	UG/L		W92-16B	Total	3.9
05504312	Water	14-Dec-05	CHROMIUM	3.1	UG/L		W92-16B	Total	5.1
104233	Water	6-Mar-06	CHROMIUM	1	UG/L		W92-16B	Total	8.7
244305	Water	14-Jun-06	CHROMIUM	3.7	UG/L		W92-16B	Total	7



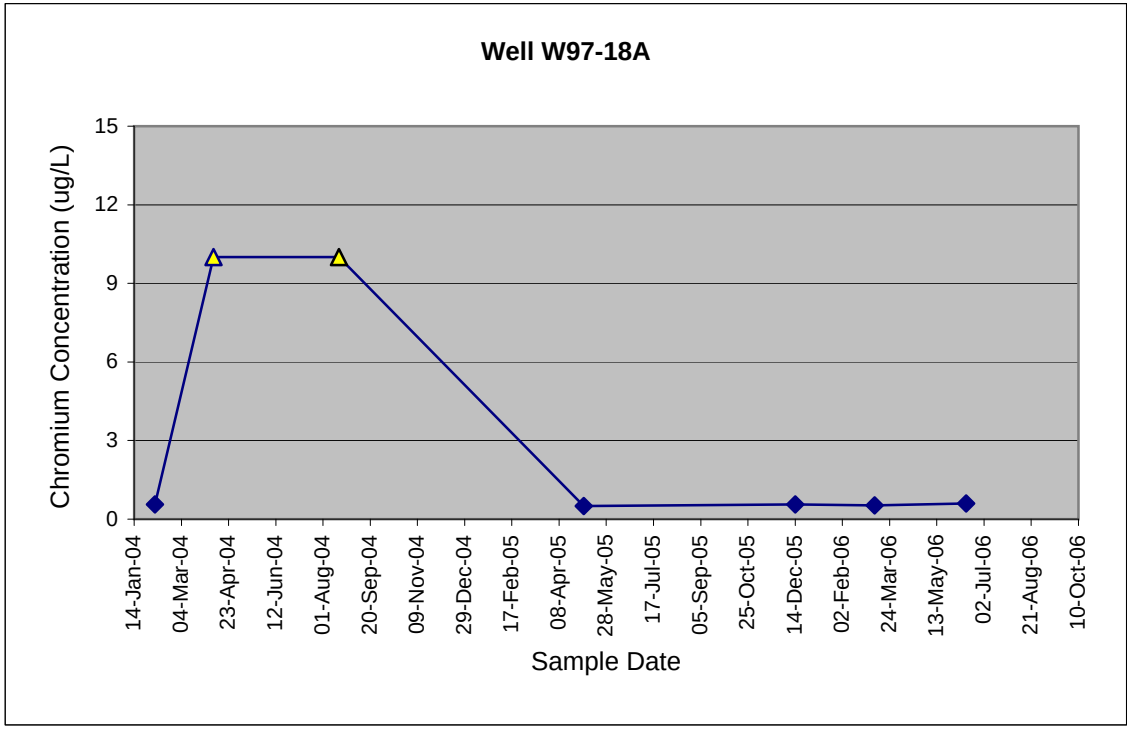
Well B85-4

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH4	Water	05-Feb-04	CHROMIUM	37.7	UG/L		B85-4	Total	1
MJ2BK1	Water	7-Apr-04	CHROMIUM	8.1	UG/L	J	B85-4	Total	0
MJ4738	Water	18-Aug-04	CHROMIUM	3.7	UG/L	J	B85-4	Total	4
184246	Water	4-May-05	CHROMIUM	1.1	UG/L		B85-4	Total	2
05504296	Water	13-Dec-05	CHROMIUM	26.8	UG/L		B85-4	Total	5.7
104237	Water	6-Mar-06	CHROMIUM	5.8	UG/L		B85-4	Total	3.9
244310	Water	14-Jun-06	CHROMIUM	0.9	UG/L		B85-4	Total	0.3



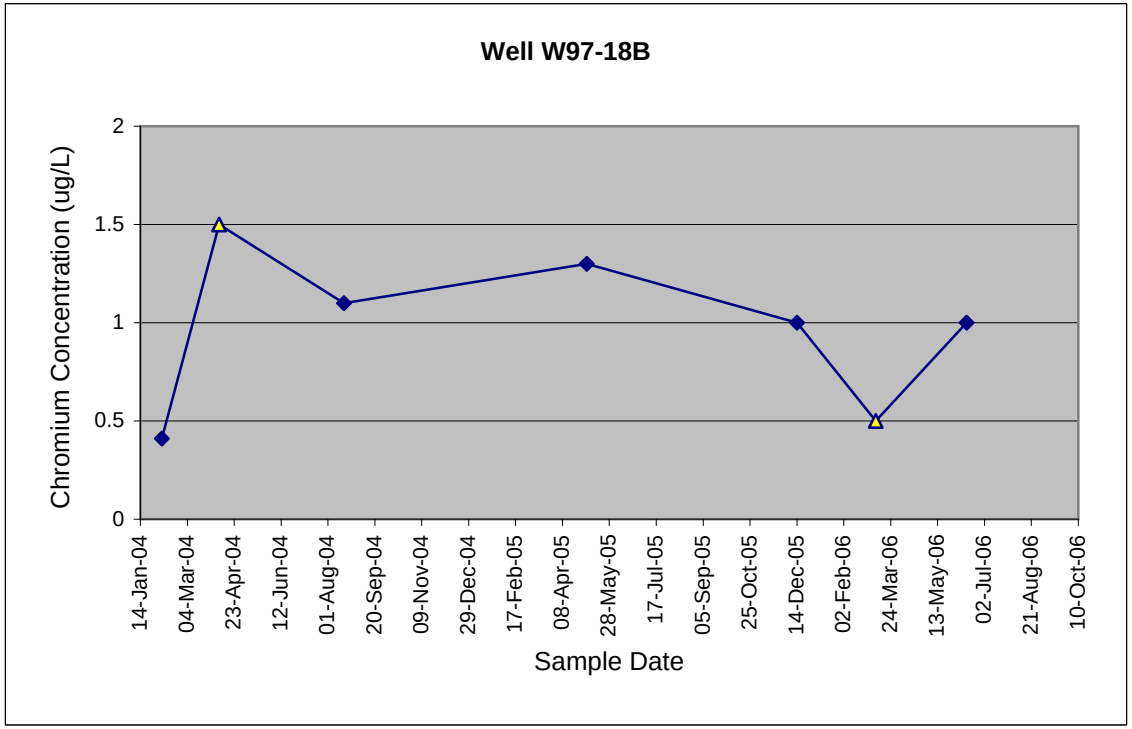
Well W97-18A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH5	Water	05-Feb-04	CHROMIUM	0.56	UG/L	J	W97-18A	Total	14
MJ2BK2	Water	7-Apr-04	CHROMIUM	10	UG/L	U	W97-18A	Total	0
MJ4739	Water	18-Aug-04	CHROMIUM	10	UG/L	U	W97-18A	Total	5
184244	Water	4-May-05	CHROMIUM	0.5	UG/L		W97-18A	Total	1
05504300	Water	14-Dec-05	CHROMIUM	0.56	UG/L		W97-18A	Total	4
104256	Water	8-Mar-06	CHROMIUM	0.53	UG/L		W97-18A	Total	0
244298	Water	13-Jun-06	CHROMIUM	0.6	UG/L		W97-18A	Total	9



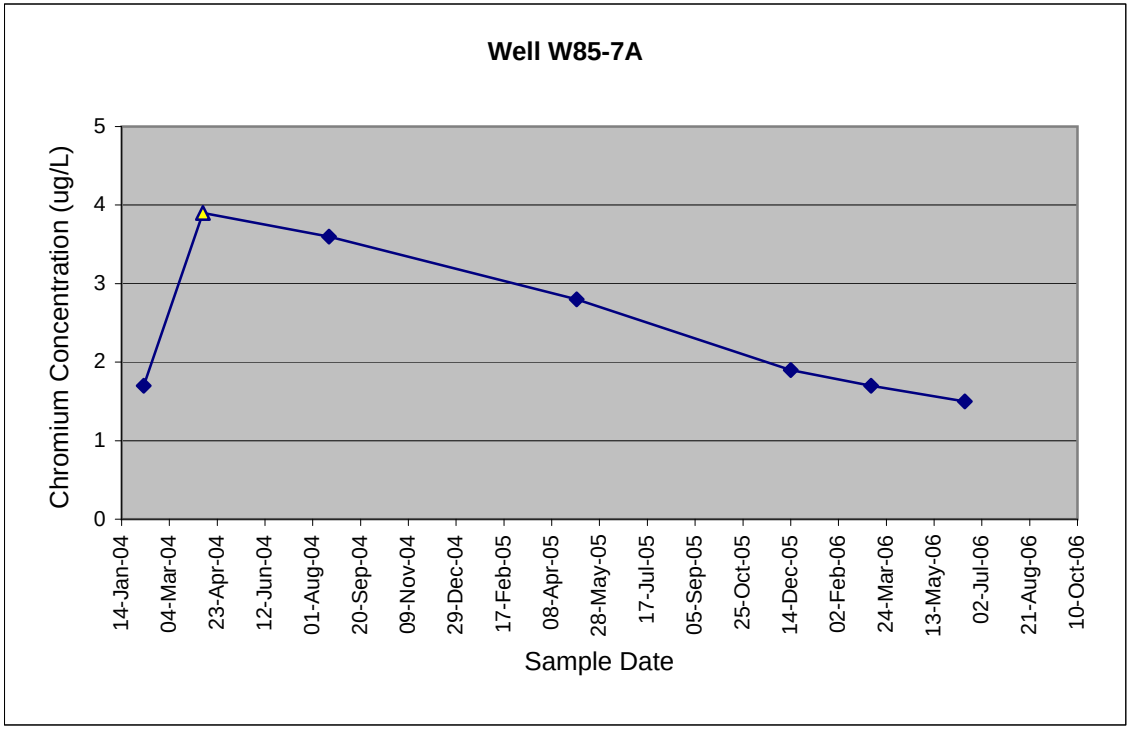
Well W97-18B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH7	Water	06-Feb-04	CHROMIUM	0.41	UG/L	J	W97-18B	Total	2
MJ2BK3	Water	7-Apr-04	CHROMIUM	1.5	UG/L	U	W97-18B	Total	0
MJ4740	Water	18-Aug-04	CHROMIUM	1.1	UG/L	J	W97-18B	Total	5
184245	Water	4-May-05	CHROMIUM	1.3	UG/L		W97-18B	Total	1.1
05504301	Water	14-Dec-05	CHROMIUM	1	UG/L		W97-18B	Total	1.1
104257	Water	8-Mar-06	CHROMIUM	0.5	UG/L	U	W97-18B	Total	1.4
244299	Water	13-Jun-06	CHROMIUM	1	UG/L		W97-18B	Total	6



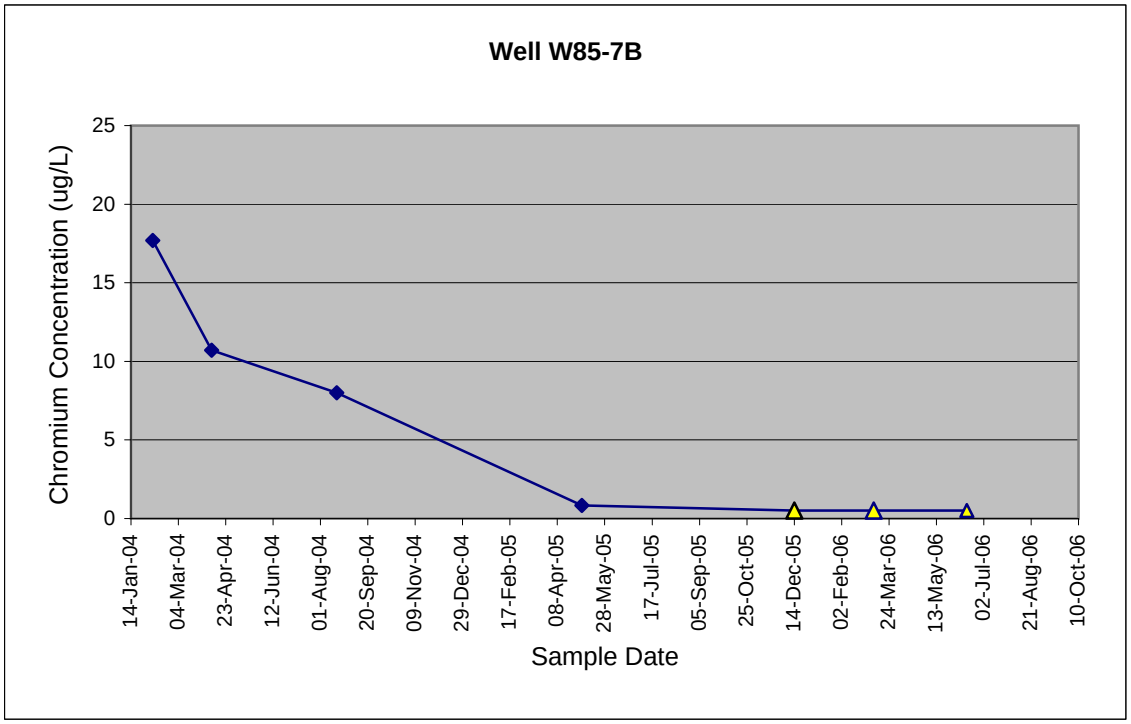
Well W85-7A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH8	Water	06-Feb-04	CHROMIUM	1.7	UG/L	J	W85-7A	Total	1
MJ2BK6	Water	8-Apr-04	CHROMIUM	3.9	UG/L	U	W85-7A	Total	0
MJ4741	Water	18-Aug-04	CHROMIUM	3.6	UG/L	J	W85-7A	Total	3
184239	Water	4-May-05	CHROMIUM	2.8	UG/L		W85-7A	Total	0.5
05504307	Water	14-Dec-05	CHROMIUM	1.9	UG/L		W85-7A	Total	0.2
104254	Water	8-Mar-06	CHROMIUM	1.7	UG/L		W85-7A	Total	0
244306	Water	14-Jun-06	CHROMIUM	1.5	UG/L		W85-7A	Total	0.2



Well W85-7B

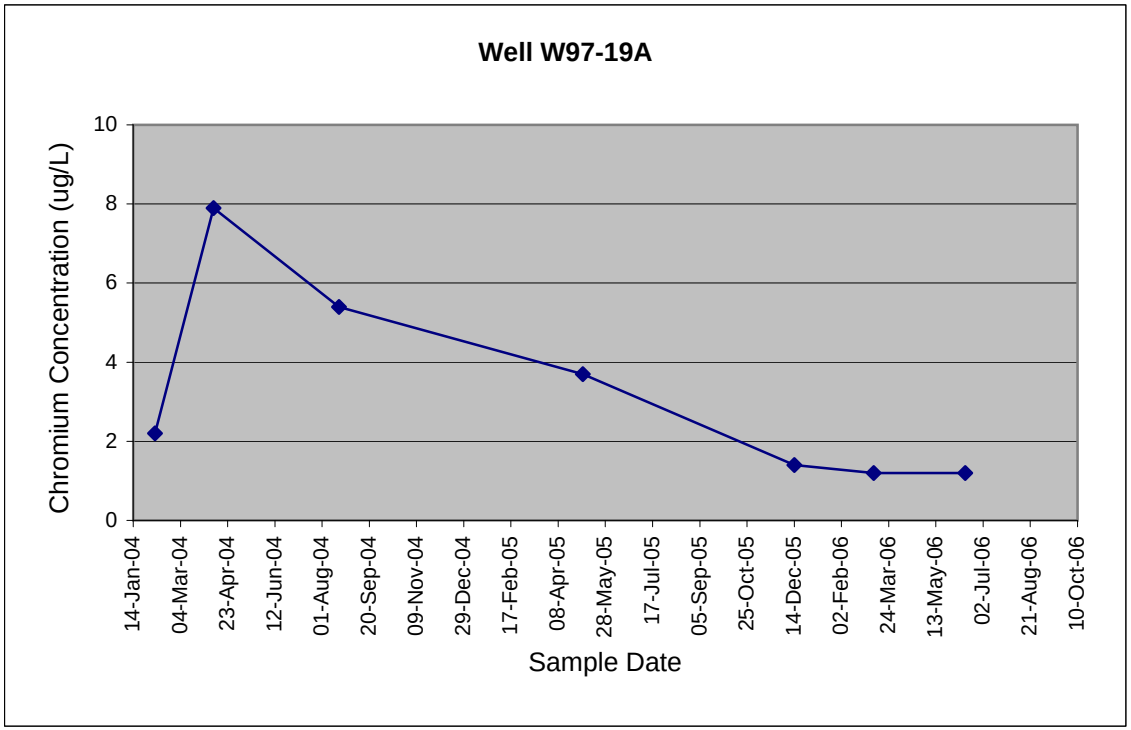
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH9	Water	06-Feb-04	CHROMIUM	17.7	UG/L		W85-7B	Total	3
MJ2BK7	Water	8-Apr-04	CHROMIUM	10.7	UG/L		W85-7B	Total	0
MJ4742	Water	18-Aug-04	CHROMIUM	8	UG/L	J	W85-7B	Total	25
184240	Water	4-May-05	CHROMIUM	0.84	UG/L		W85-7B	Total	6.7
05504308	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W85-7B	Total	1.4
104255	Water	8-Mar-06	CHROMIUM	0.5	UG/L	U	W85-7B	Total	0
244307	Water	14-Jun-06	CHROMIUM	0.5	UG/L	U	W85-7B	Total	0.7



Note: Although turbidity was greater than 10 NTU, no filtered sample was collected.

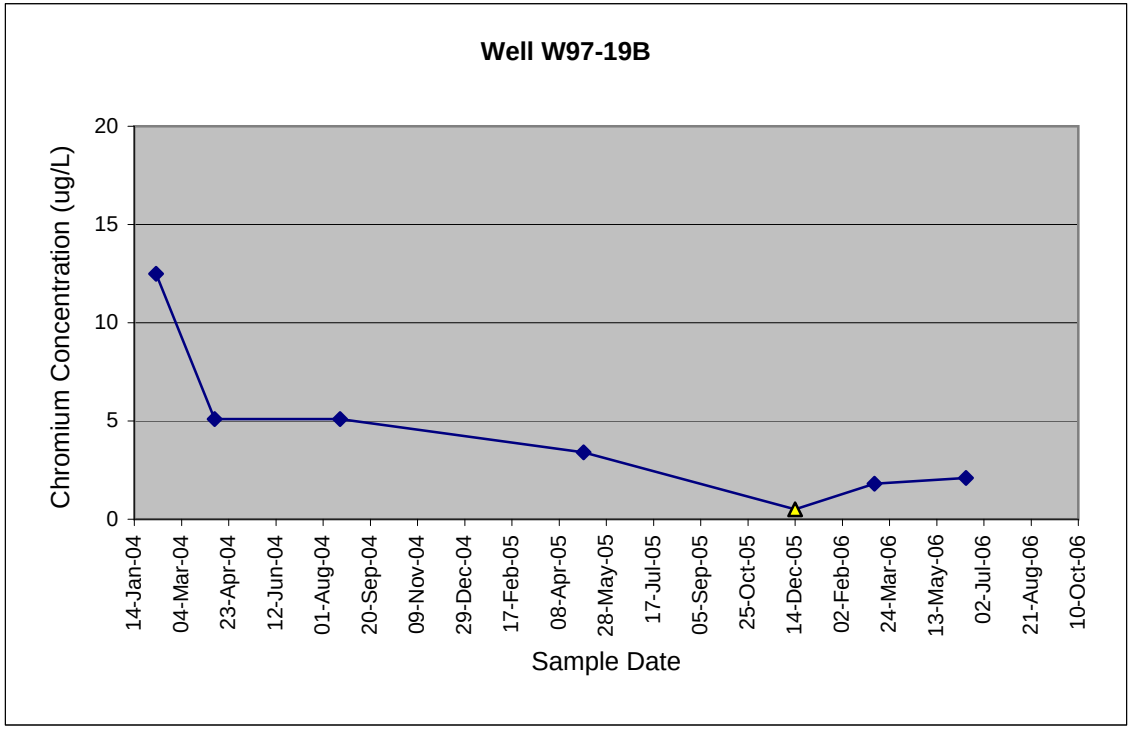
Well W97-19A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ0	Water	06-Feb-04	CHROMIUM	2.2	UG/L	J	W97-19A	Total	7
MJ2BK4	Water	8-Apr-04	CHROMIUM	7.9	UG/L	J	W97-19A	Total	2
MJ4749	Water	19-Aug-04	CHROMIUM	5.4	UG/L	J	W97-19A	Total	8
184242	Water	4-May-05	CHROMIUM	3.7	UG/L		W97-19A	Total	1.8
05504303	Water	14-Dec-05	CHROMIUM	1.4	UG/L		W97-19A	Total	0
104259	Water	8-Mar-06	CHROMIUM	1.2	UG/L		W97-19A	Total	1
244296	Water	13-Jun-06	CHROMIUM	1.2	UG/L		W97-19A	Total	1



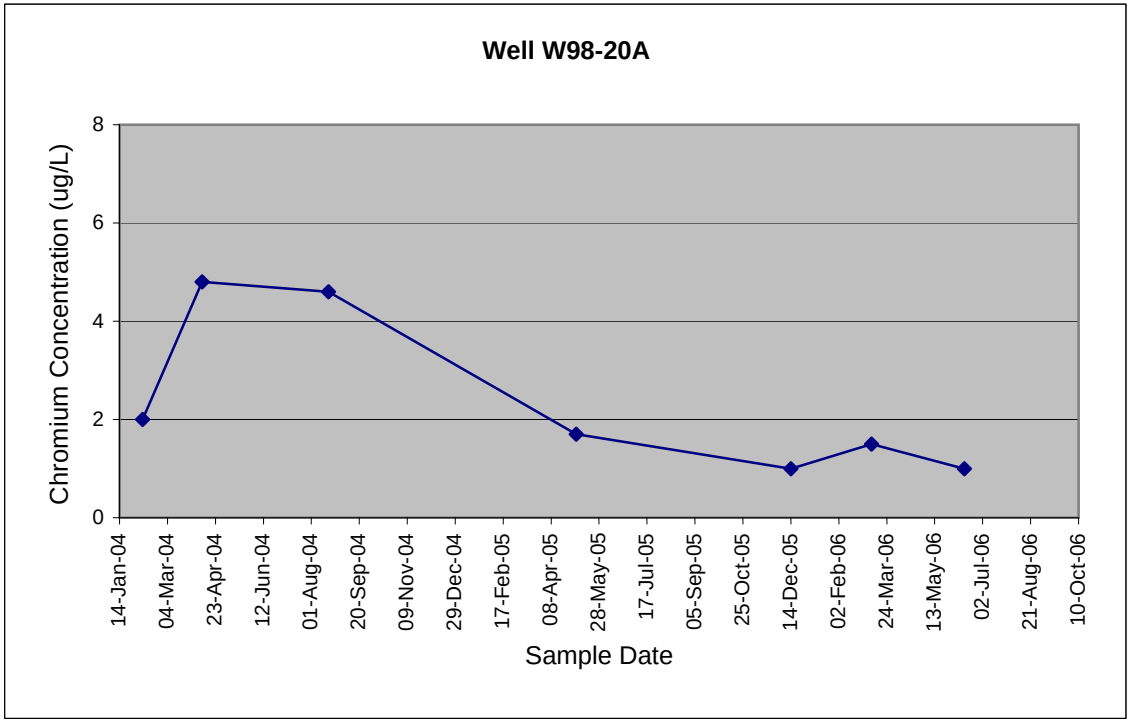
Well W97-19B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ1	Water	06-Feb-04	CHROMIUM	12.5	UG/L	J	W97-19B	Total	0
MJ2BK5	Water	8-Apr-04	CHROMIUM	5.1	UG/L	J	W97-19B	Total	1
MJ4750	Water	19-Aug-04	CHROMIUM	5.1	UG/L	J	W97-19B	Total	3
184243	Water	4-May-05	CHROMIUM	3.4	UG/L		W97-19B	Total	1
05504304	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W97-19B	Total	0
104260	Water	8-Mar-06	CHROMIUM	1.8	UG/L		W97-19B	Total	5
244297	Water	13-Jun-06	CHROMIUM	2.1	UG/L		W97-19B	Total	0.5



Well W98-20A

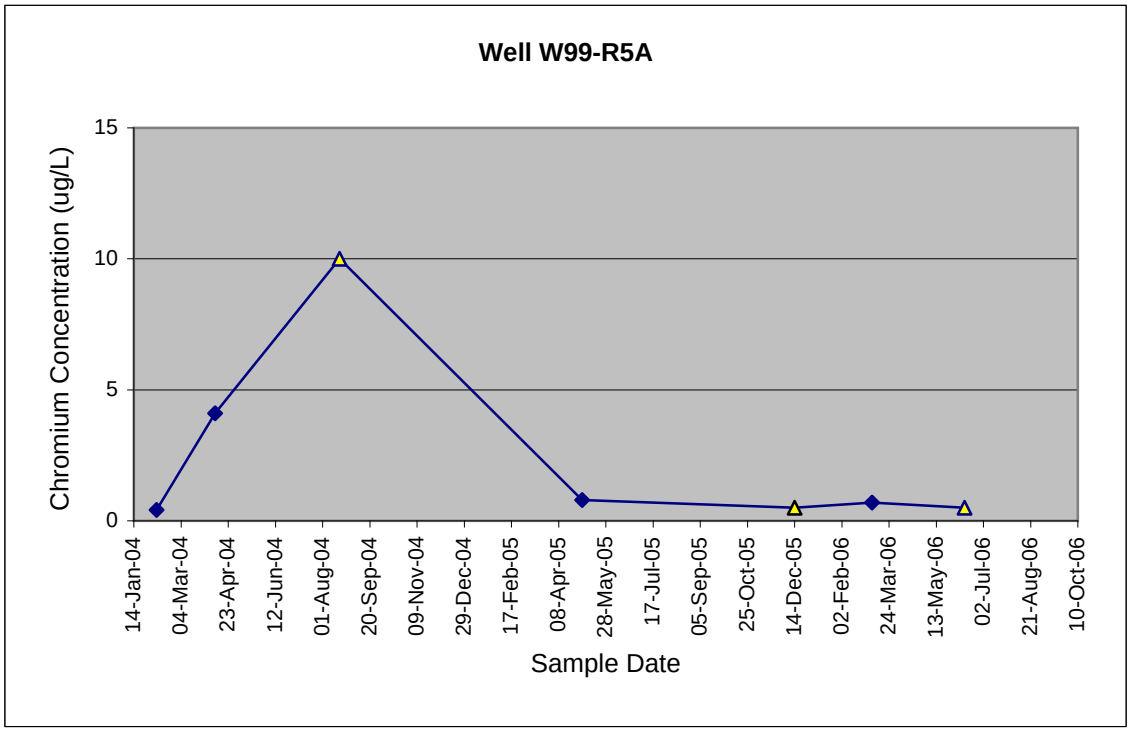
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ2	Water	07-Feb-04	CHROMIUM	2	UG/L	J	W98-20A	Total	1
MJ2BL2	Water	9-Apr-04	CHROMIUM	4.8	UG/L	J	W98-20A	Total	0
MJ4752	Water	19-Aug-04	CHROMIUM	4.6	UG/L	J	W98-20A	Dissolved	20
184241	Water	4-May-05	CHROMIUM	1.7	UG/L		W98-20A	Total	0.5
05504302	Water	14-Dec-05	CHROMIUM	1	UG/L		W98-20A	Total	0
104258	Water	8-Mar-06	CHROMIUM	1.5	UG/L		W98-20A	Total	0
244300	Water	13-Jun-06	CHROMIUM	1	UG/L		W98-20A	Total	0.4



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

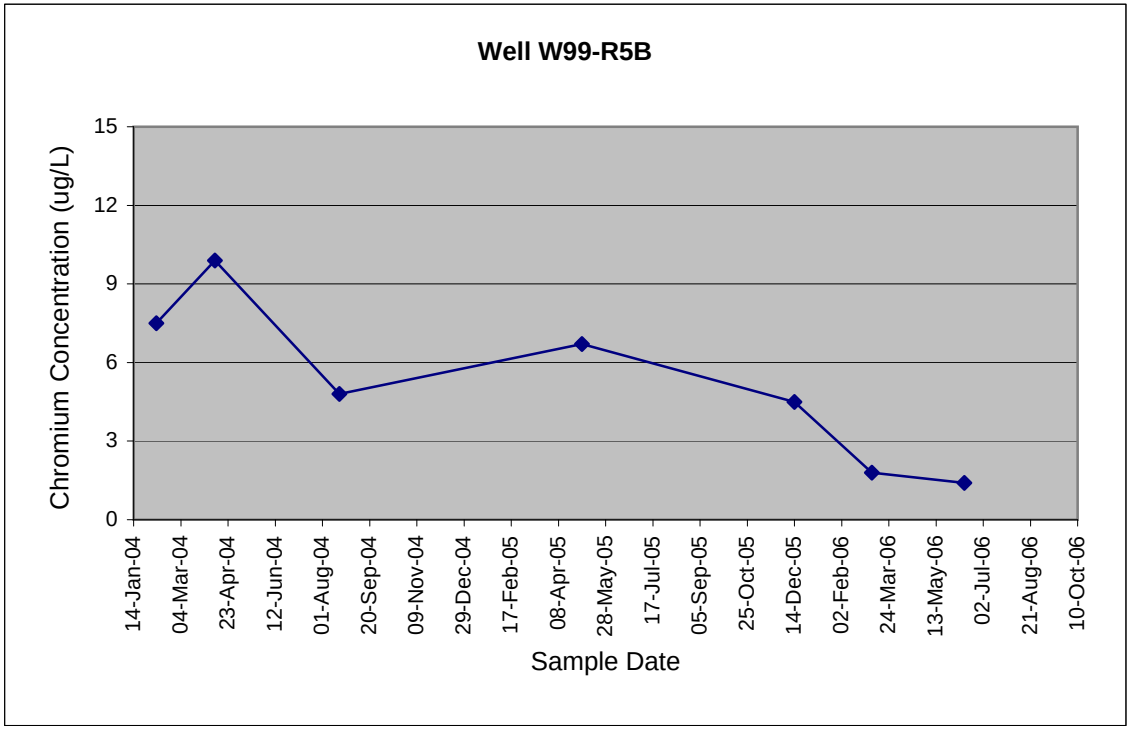
Well W99-R5A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ3	Water	07-Feb-04	CHROMIUM	0.41	UG/L	J	W99-R5A	Total	0
MJ2BL3	Water	9-Apr-04	CHROMIUM	4.1	UG/L	J	W99-R5A	Total	0
MJ4745	Water	19-Aug-04	CHROMIUM	10	UG/L	U	W99-R5A	Total	10
184230	Water	3-May-05	CHROMIUM	0.79	UG/L		W99-R5A	Total	1
05504305	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W99-R5A	Total	0
104230	Water	6-Mar-06	CHROMIUM	0.7	UG/L		W99-R5A	Total	0
244280	Water	12-Jun-06	CHROMIUM	0.5	UG/L	U	W99-R5A	Total	1



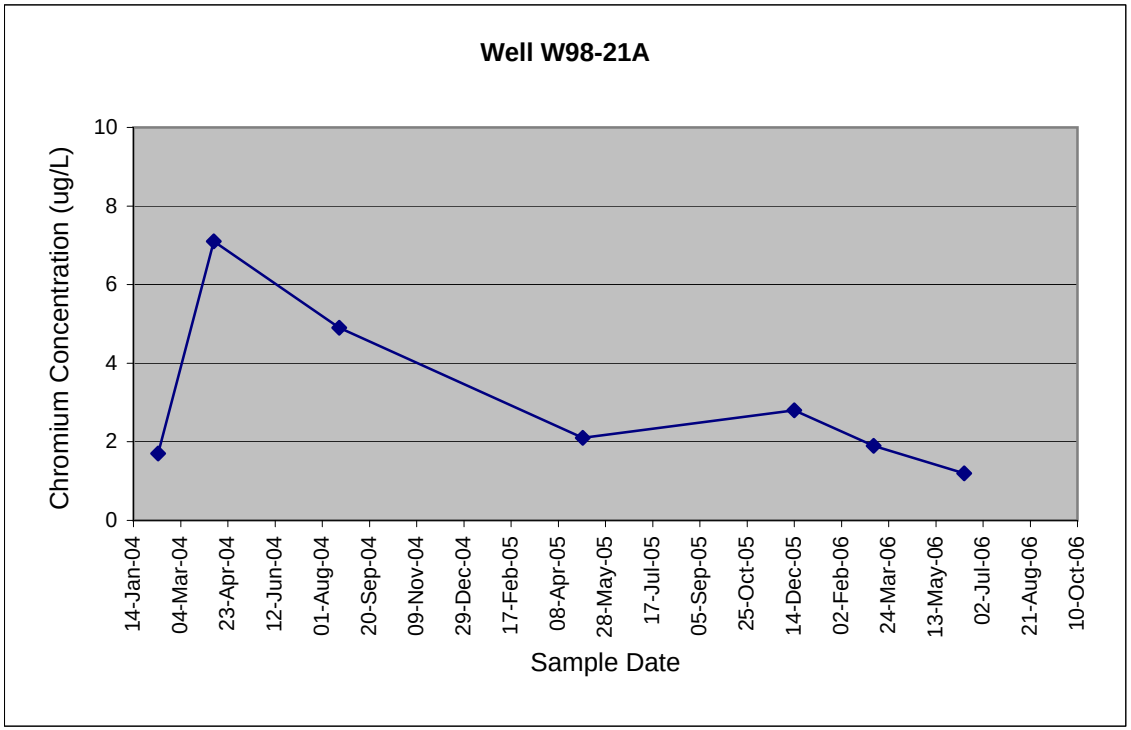
Well W99-R5B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ5	Water	07-Feb-04	CHROMIUM	7.5	UG/L	J	W99-R5B	Total	0
MJ2BL4	Water	9-Apr-04	CHROMIUM	9.9	UG/L	J	W99-R5B	Total	0
MJ4746	Water	19-Aug-04	CHROMIUM	4.8	UG/L	J	W99-R5B	Total	8
184231	Water	3-May-05	CHROMIUM	6.7	UG/L		W99-R5B	Total	2.3
05504306	Water	14-Dec-05	CHROMIUM	4.5	UG/L		W99-R5B	Total	2.1
104231	Water	6-Mar-06	CHROMIUM	1.8	UG/L		W99-R5B	Total	0
244281	Water	12-Jun-06	CHROMIUM	1.4	UG/L		W99-R5B	Total	3



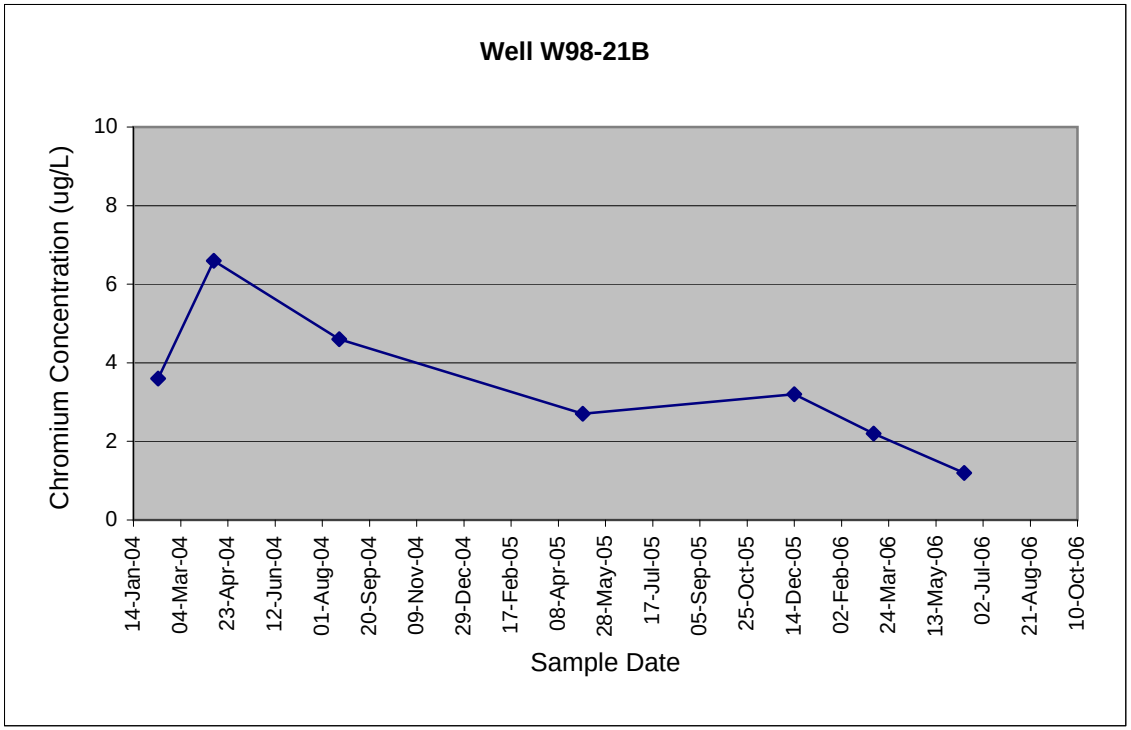
Well W98-21A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ6	Water	09-Feb-04	CHROMIUM	1.7	UG/L	J	W98-21A	Total	No Data
MJ2BK8	Water	8-Apr-04	CHROMIUM	7.1	UG/L	J	W98-21A	Total	0
MJ4743	Water	19-Aug-04	CHROMIUM	4.9	UG/L	J	W98-21A	Total	0
184237	Water	4-May-05	CHROMIUM	2.1	UG/L		W98-21A	Total	1.3
05504309	Water	14-Dec-05	CHROMIUM	2.8	UG/L		W98-21A	Total	0.1
104261	Water	8-Mar-06	CHROMIUM	1.9	UG/L		W98-21A	Total	0
244282	Water	12-Jun-06	CHROMIUM	1.2	UG/L		W98-21A	Total	0.3



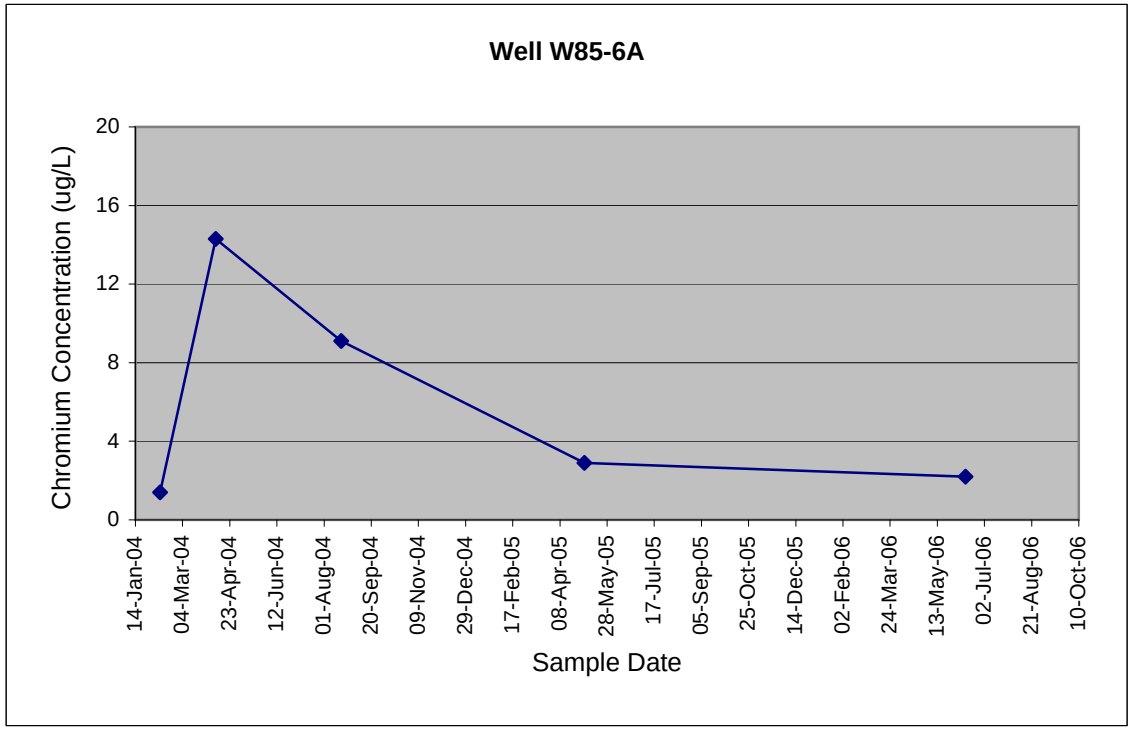
Well W98-21B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ7	Water	09-Feb-04	CHROMIUM	3.6	UG/L	J	W98-21B	Total	No Data
MJ2BK9	Water	8-Apr-04	CHROMIUM	6.6	UG/L	J	W98-21B	Total	0
MJ4744	Water	19-Aug-04	CHROMIUM	4.6	UG/L	J	W98-21B	Total	5
184238	Water	4-May-05	CHROMIUM	2.7	UG/L		W98-21B	Total	0.5
05504310	Water	14-Dec-05	CHROMIUM	3.2	UG/L		W98-21B	Total	0
104262	Water	8-Mar-06	CHROMIUM	2.2	UG/L		W98-21B	Total	0
244283	Water	12-Jun-06	CHROMIUM	1.2	UG/L		W98-21B	Total	0.3



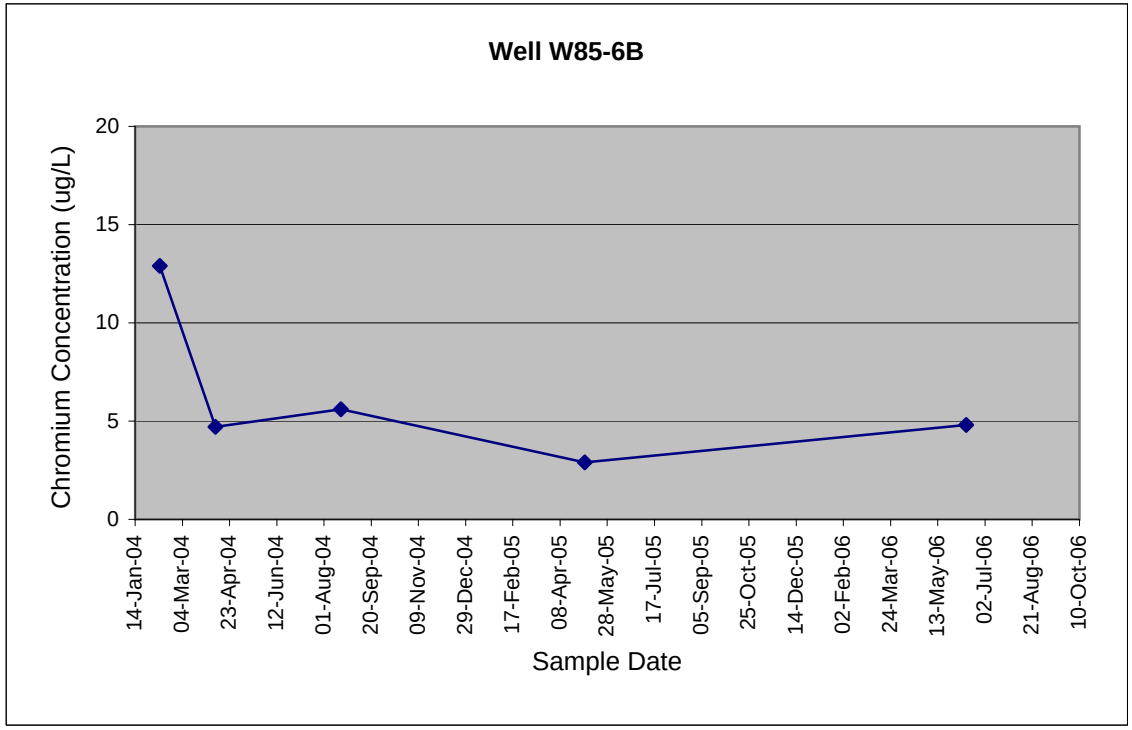
Well W85-6A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ8	Water	09-Feb-04	CHROMIUM	1.4	UG/L	J	W85-6A	Total	No Data
MJ2BL0	Water	8-Apr-04	CHROMIUM	14.3	UG/L		W85-6A	Total	0
MJ4747	Water	19-Aug-04	CHROMIUM	9.1	UG/L	J	W85-6A	Total	<10
184235	Water	4-May-05	CHROMIUM	2.9	UG/L		W85-6A	Total	1
244284	Water	12-Jun-06	CHROMIUM	2.2	UG/L		W85-6A	Total	0.7



Well W85-6B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ9	Water	09-Feb-04	CHROMIUM	12.9	UG/L		W85-6B	Total	No Data
MJ2BL1	Water	8-Apr-04	CHROMIUM	4.7	UG/L	J	W85-6B	Total	0
MJ4748	Water	19-Aug-04	CHROMIUM	5.6	UG/L	J	W85-6B	Total	5
184236	Water	4-May-05	CHROMIUM	2.9	UG/L		W85-6B	Total	1
244286	Water	12-Jun-06	CHROMIUM	4.8	UG/L		W85-6B	Total	49



APPENDIX B

LABORATORY DATA SHEETS

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard, Washington 98366

Case Narrative

July 11, 2006

Subject: Metals Frontier Hardchrome

Project No: 142406

Officer: Guy Barrett

By: Dean Momohara

Summary

The samples were analyzed and/or digested using the following methods: EPA method 200.7 for the digestion and analysis of minerals and EPA method 200.8 (ICPMS) for the digestion and analysis of trace metals.

All analyses requested were evaluated by established regulatory quality assurance guidelines.

Sample Information

Samples were received by Manchester Environmental Laboratory on 06/16/06. All coolers were received within the proper temperature range of 0°C - 6°C. The samples were received in good condition and were properly preserved. Forty (40) samples were received and assigned laboratory identification numbers 244280 – 244319.

Holding Times

All analyses were performed within established EPA holding times.

Calibration

Instrument calibrations and calibration checks were performed in accordance with the appropriate method. Except for calibration checks for all dissolved silver samples, for samples 244312, 24415, 244317, 244318 and 244319 for total chromium, vanadium and cobalt analysis, all initial and continuing calibration checks were within control limits.

The associated calibration checks for all of these samples were less than the lower acceptance limit due to matrix interference. The results were qualified as estimates. ICPMS calibration correlation coefficients were within the acceptance range of 1.000 - 0.995. The instruments were calibrated with NIST traceable standards and verified to be in calibration with a second source NIST traceable standard.

Method Blanks

Due to method blank contamination, the total copper MB reporting limit was raised to 1.0 ug/L, per client approval. No other analytically significant levels of analyte were detected in the MBs associated with these samples.

Matrix Spikes

The matrix spike (MS) recoveries for total calcium and total sodium and potassium associated with sample 244303 were not calculated. The standard spiking level was insufficient for the elevated concentration of analyte in the source sample and no action was taken. All other MS recoveries were within the acceptance limits of 75% - 125%.

Replicates

All duplicate relative percent differences of samples with concentrations greater than 5 times the reporting limit were within the acceptance range of 0% - 20%.

Laboratory Control Samples

All laboratory control sample recoveries were within the acceptance limits of 85% - 115%.

Other Quality Assurance Measures and Issues

All internal standard recoveries were within acceptance limits.

Samples 244313 and 244314 were diluted 100 times prior to analyses due to matrix interference. For some analyses, samples 244086, 244089, 244292, 244312, 244316, 244318 and 244319 were diluted 10 times prior to analyses due to matrix interference. The reporting limits were raised accordingly.

All results for total aluminum were qualified as estimates. The samples contained matrix interference that caused the background elevation in each sample.

U - The analyte was not detected at or above the reported result.

UJ - The analyte was not detected at or above the reported estimated result.

J - The analyte was positively identified. The associated numerical result is an estimate.

NC - Not Calculated

bold - The analyte was present in the sample. (Visual Aid to locate detected compounds on report sheet.)

Please call Dean Momohara at (360) 871-8808 to further discuss this project.

cc: Project File

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Frontier Hardchrome - 24 **LIMS Project ID:** 1424-06

Project Officer: Guy Barrett **Method:** EPA200.8

Date Reported: 07/10/06 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
06244280		W99-R5A	Water	0.50	U	ug/L	06/12/06	07/06/06
06244281		W99-R5B	Water	**1.4**		ug/L	06/12/06	07/06/06
06244282		W98-21A	Water	**1.2**		ug/L	06/12/06	07/06/06
06244283		W98-21B	Water	**1.2**		ug/L	06/12/06	07/06/06
06244284		W85-6A	Water	**2.2**		ug/L	06/12/06	07/06/06
06244285		W85-6B	Water	**4.8**		ug/L	06/12/06	07/06/06
06244288		RA-MW-16B	Water	**3.2**		ug/L	06/12/06	07/06/06
06244290		RA-MW-15A	Water	**4.6**		ug/L	06/12/06	07/06/06
06244291		RA-MW-15B	Water	**152**		ug/L	06/12/06	07/06/06
06244293		RA-MW-17A	Water	**5.73**		ug/L	06/13/06	07/06/06
06244294		RA-MW-14A	Water	**1.8**		ug/L	06/13/06	07/06/06
06244295		RA-MW-14B	Water	**0.71**		ug/L	06/13/06	07/06/06
06244296		W97-19A	Water	**1.2**		ug/L	06/13/06	07/06/06
06244297		W97-19B	Water	**2.1**		ug/L	06/13/06	07/06/06
06244298		W97-18A	Water	**0.57**		ug/L	06/13/06	07/06/06
06244299		W97-18B	Water	**0.96**		ug/L	06/13/06	07/06/06
06244300		W98-20A	Water	**0.99**		ug/L	06/13/06	07/06/06
06244301		RA-MW-13A	Water	**1.5**		ug/L	06/14/06	07/06/06
06244302		RA-MW-13B	Water	**0.66**		ug/L	06/14/06	07/06/06
06244302	LMX1 (matrix spike)			**101**		%	06/14/06	07/06/06
06244302	LMX2 (matrix spike)			**102**		%	06/14/06	07/06/06
06244303		RA-MW-13C	Water	**4.1**		ug/L	06/14/06	07/06/06
MB06179I3		Lab BLNK	Water	0.50	U	ug/L		07/06/06
ML0617913		Lab LCS-	Water	**103**		%		07/06/06

Authorized By: M. Jones Release Date: 7/10/06 Page: 1

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Frontier Hardchrome - 24 **LIMS Project ID:** 1424-06

Project Officer: Guy Barrett **Method:** EPA200.8

Date Reported: 07/10/06 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
06244287		RA-MW-16A	Water	2.8		ug/L	06/12/06	07/06/06
062443O4		W92-16A	Water	1.1		ug/L	06/14/06	07/06/06
062443O4	LMX1 (matrix spike)			100		%	06/14/06	07/06/06
062443O4	LMX2 (matrix spike)			101		%	06/14/06	07/06/06
062443O5		W92-16B	Water	3.7		ug/L	06/14/06	07/06/06
062443O6		W85-7A	Water	1.5		ug/L	06/14/06	07/06/06
062443O7		W85-7B	Water	0.50	U	ug/L	06/14/06	07/06/06
062443O8		B87-B	Water	21.8		ug/L	06/14/06	07/06/06
062443O9			Water	21.0		ug/L	06/14/06	07/06/06
062443 10		B85-4	Water	0.85		ug/L	06/14/06	07/06/06
062443 11		B85-3	Water	5.44		ug/L	06/14/06	07/06/06
062443 12		RA-MW-12A	Water	125	J	ug/L	06/15/06	07/06/06
062443 15		RA-MW-12B	Water	2.4	J	ug/L	06/15/06	07/06/06
062443 17		RA-MW-12C	Water	0.55	J	ug/L	06/15/06	07/06/06
062443 18		RA-MW-11A	Water	5.0	UJ	ug/L	06/15/06	07/06/06
062443 19		RA-MW-11B	Water	3.7	J	ug/L	06/15/06	07/06/06
MB061 80I2		Lab BLNK	Water	0.50	U	ug/L		07/06/06
ML061 80I2		Lab LCS-	Water	103		%		07/06/06

Authorized By: M. Jones Release Date: 7/10/06

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium, Dissolved

Project Name: Frontier Hardchrome - 24 **LIMS Project ID:** 1424-06

Project Officer: Guy Barrett **Method:** EPA200.8

Date Reported: 07/10/06 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
06244286		W85-6B	Field Filtered water	5.0	U	ug/L	06/12/06	07/07/06
06244289		RA-MW-16B	Field Filtered water	5.0	U	ug/L	06/12/06	07/07/06
06244289	LMX1 (matrix spike)			**101**		%	06/12/06	07/07/06
06244289	LMX2 (matrix spike)			**98**		%	06/12/06	07/07/06
06244292		RA-MW-15B	Field Filtered water	5.0	U	ug/L	06/12/06	07/07/06
06244313		RA-MW-12A	Field Filtered water	50	U	ug/L	06/15/06	07/07/06
06244314		RA-MW-12A	Field Filtered water	50	U	ug/L	06/15/06	07/07/06
06244316		RA-MW-12B	Field Filtered water	5.0	U	ug/L	06/15/06	07/07/06
MB06188I1		Lab BLNK	Water	0.50	U	ug/L		07/07/06
ML06188I1		Lab LCS-	Water	**98**		%		07/07/06

Authorized By: M-Jones Release Date: 7/10/06

APPENDIX C

DATA VALIDATION MEMORANDUM

EXCEPTION SUMMARY FOR LABORATORY DATA QUALITY ASSURANCE REVIEW

DATA SUMMARY

The laboratory data quality assurance review and validation of analytical results for 40 water samples, Project Number 1424-06, collected between 12 June 2006 and 15 June 2006 from the Frontier Hard Chrome site has been completed. This review incorporates sample results for other metals for assessment purposes, but applies only to the following analyses:

- Total and dissolved chromium by Washington State Department of Ecology's (WDOE) Manchester Environmental Laboratory (MEL), of Port Orchard, Washington, following EPA Method 200.8 – inductively-coupled plasma/mass spectrometry (IC/MS).

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. A data review was performed by the laboratory QA section on laboratory quality control results to ensure they met method quality objectives for the project. Data review followed the format outlined in the *National Functional Guidelines for Inorganic Data Review* (EPA 2004), modified to include specific criteria specified in the *Frontier Hard Chrome Long-Term Monitoring Plan* (Work Plan; Weston 2004). Raw laboratory data including calibrations, sample login forms, sample preparation logs and bench sheets, mass spectral tuning data, nor raw instrument data were not available for this review.

This is an exception summary. All laboratory quality assurance results as applicable (e.g., holding times; blank sample analysis, matrix spike/duplicate spike analysis, and laboratory control sample analysis results) supplied to Weston for the analyses met acceptance criteria specified in the Work Plan (Weston 2004), with the following exception:

CALIBRATION VERIFICATION

The laboratory indicated that chromium recovery from calibration check sample analyses were less than the lower control limit; but did not provide the recoveries. If any recovery is less than 75 percent, non-detected chromium results would be rejected for use. For the present event, this would affect sample **RA-MW-11A**. Due to the lack of additional information, no data were qualified for this event.

The laboratory attributed these low recoveries to a "matrix effect"; this concerning, because it is not a tenable explanation; CCV samples are prepared using acidified reagent grade water only. If the laboratory believes that there was carry-over or other memory effects due to the complex sample matrix, analyses should not have continued until appropriate action (e.g., additional rinse blanks) had been implemented. Data not bracketed by valid QC sample recoveries should be viewed cautiously.

OTHER DATA QUALIFICATION

No other QA/QC exceptions were noted in the data review. Upon consideration of the data qualifications noted above and the project data quality objectives specified in the QAPP, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values.

DATA QUALIFIERS

Any data qualifiers applied by the laboratory have been removed from the data summary sheets and superseded by data validation qualifiers as follow:

The following qualifiers were used to modify the data quality and usefulness of individual analytical results.

- **U** - The analyte was not detected at the given quantitation limit.
- **UJ** - The analyte was positively identified and detected; however, the quantitation limit is an estimated value because quality control criteria were not met.
- **J** - The analyte was positively identified and detected; however, the concentration is an estimated value because the result is less than the quantitation limit or quality control criteria were not met.

DATA ASSESSMENT

Data review was performed by an experienced quality assurance chemist independent of the analytical laboratory and not directly involved in the project.

This is to certify that I have examined the analytical data and based on the information provided to me by the laboratory, in my professional judgment the data are acceptable for use except where qualified with qualifiers that modify the usefulness of those individual values.

Origonal signed 27 July 2006
R. Paul Swift, Ph.D. Date
Chief Chemist